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ART. I.—*Statistical Researches relative to the Etiology of Pulmonary and Rheumatic Diseases, illustrating the application of the Laws of Climate to the Science of Medicine; based on the Records of the Medical Department and Adjutant General's Office.* By SAMUEL FORRY, M. D., Medical Staff, United States Army.

THE object of the author in this paper is, to elucidate the laws which obtain in regard to the etiology of pulmonary and rheumatic diseases in the several systems of climate pertaining to the United States, and to demonstrate the advantages of peninsular Florida as a winter residence for pulmonic invalids.

Stretching over a vast extent of territory, the United States present a corresponding variety of climate, exhibiting, under multiform aspects, the animal and vegetable kingdoms. Occupying, as we do, the eastern coast of a continent of the northern hemisphere, the human frame is exposed to the contrasted seasons of the most excessive clime.* The extreme north has a

* So striking is this difference between our coast and the western coast of Europe, that Fort Sullivan, Maine, notwithstanding it is more than 11° south of Edinburg, Scot., exhibits a mean annual temperature 5½° lower, and Bordeaux, which is parallel with Fort Sullivan, has an annual temperature 15° degrees higher. These results find a ready explanation in physical causes. Europe is separated from the polar circle by an ocean, whilst eastern America stretches northwards at least to the 82° of latitude. The former, intersected by seas which temper the climate, moderating alike the excess of heat and cold, may be considered a mere prolongation of the eastern continent, whilst the northern

climate in which cold predominates, vexed by winds that have passed over interminable snows; the south acknowledges the genial influence of the sun; whilst the middle vibrates alternately to both extremes. The climate of the United States is, in truth, remarkably inconstant and variable, "passing rapidly," says Malte-Brun, "from the frosts of Norway to the scorching heats of Africa, and from the humidity of Holland to the drought of Castile." So sudden are the vicissitudes of weather in the middle States, that in the language of the Spectator, we often "lie down in July and rise in December."

The term *climate*, which is limited, in its rigorous acceptation, to a mere geographical division, and in ordinary parlance to the temperature only of a region, possesses, in medical science, a wider signification. It embraces not only the temperature of the atmosphere, but all those modifications of it which produce a sensible effect on our organs, such as its serenity and humidity, changes of electric tension, variations of barometric pressure, the admixture of terrestial emanations dissolved in its moisture, and its tranquility as respects both horizontal and vertical currents. Climate, in a word, constitutes the aggregate of all the external physical circumstances appertaining to each locality in its relation to organic nature. "To observe,"

lands of the latter, elevated from 3000 to 5000 feet, become a great reservoir of ice and snow, which diminish the temperature of adjoining regions. These results gave rise to the opinion that the old continent is warmer than the new, but more recent observation has shown that the western coast of both has a higher temperature than the eastern, in corresponding latitudes. This arises mainly from the steady prevalence of westerly winds, between the parallels of 30° and 40°; for there is thus swept from the ocean, which never sinks below the freezing point, a humid atmosphere, which, in its passage over the land, has a constant tendency to establish an equilibrium of temperature, and as its vapour is gradually condensed, it also evolves its latent heat. Philadelphia and Pekin, each on the eastern coast of its respective continent, and nearly in latitude 40°, have the same mean annual temperature; whilst on the western coast of the old and the new world, the same annual temperature is found about the 48th parallel. A striking resemblance is thus apparent in tracing the same isothermal line around the northern hemisphere, the east side of both continents presenting concave, and the west side convex summits. Continuing this comparison, it is seen that the climate of the new world, viewed in its general features, is, contrary to common opinion, more mild and uniform than that of the old. Taking, for example, the annual temperature of 53°.60, the eastern coast of Asia shows a difference of 55°.80 in the mean temperature of summer and winter, whilst the eastern coast of America exhibits a difference only of 43°.60; and, on the other hand, the western coasts of Europe and of America present respectively a difference of 28°.30 and 23°. Hence, the fallacy of the opinion which ascribes the mild climate of Europe to the influence of agricultural improvement, becomes at once apparent, when it is considered that the region of Oregon, lying west of the Rocky Mountains, which continues in a state of nature, has a climate less contrasted than that of Europe in similar latitudes, and that consequently it is in a proportionate degree milder than the climate of our own region, in which the labours of man in a few ages have almost wrought miracles, as well as that of the eastern coast of Asia, which has been under cultivation for several thousand years.

says Professor Rostan, "the simultaneous effects of light, heat, electricity, of the winds, &c., on the organic productions of the different zones of the earth, to explore the nature of this earth, to deduce from this knowledge the influence which they exercise on the physical and moral state of man, such is the wide field which climates *present* to our investigation."

The little knowledge that we possess upon these various points, is far from being precise. On the one hand, we are ignorant what constitute the real elements of climate; and, on the other hand, these complex agents act upon living organs still more complex in their functions. Our knowledge heretofore has consisted mainly of the unexplained results of experience. As the subject does not admit of the precision of the exact sciences, the aid of induction and analogy must be invoked. Having once acquired a knowledge of the distinctive characters of different systems of climate and of their effects upon the animal economy both in health and disease, the general laws regulating such influences may be readily ascertained. In the present inquiry, *the temperature of the air, and its hygrometrical state*—agents always supposed to exert a potent influence in the causation of pulmonary and rheumatic diseases—will alone be considered. Although it is necessary, in attempting to determine the relation subsisting between climate and vital action, to take into view the simultaneous influence of all meteorological causes; yet, as caloric is the controlling element in the constitution of climate, modifying its other properties, its laws, it is believed, will give, so far as the present inquiry is concerned, a very correct expression of climatic influence.

As it is intended to illustrate the application of the laws of temperature to the science of medicine, so far as they have relation with pulmonary and rheumatic diseases, it will be necessary to advert to those laws in a general way. In the northern division of the United States, four systems of climate representing two classes may be demonstrated, the one occupying the Atlantic and the Lakes, and the other, the intermediate region and that beyond the lakes. In arranging the medical statistics of the military posts, this classification of them will be adopted, following it up in the Middle and Southern divisions of the United States.

If the phenomena of terrestrial temperature depended solely on the position of the sun, climates might be classified with mathematical precision; but the effects produced by solar heat are so much modified by local causes that the character of a climate can be determined only by observation; and accordingly, the following classification, adopted in the present inquiry, is based upon particular systems of climate as determined by observation:—

General Divisions of the United States.		*Systems of Climate.*
1. Northern.	1 Class.	Posts on the coast of New England, extending as far south as the harbor of New York.
	2 "	Posts on the northern chain of lakes.
	3 "	Posts remote from the ocean and inland seas.

General Divisions of the United States.		*Systems of Climate.*
2. Middle.	1 Class.	Atlantic coast from Delaware Bay to Savannah.
	2 "	Interior Stations.
3. Southern.	1 Class.	Posts on the Lower Mississippi.
	2 "	Posts in the Peninsula of East Florida.

It is deemed sufficient to give an outline of the peculiarities of these systems of climate, characterized by a greater or less deviation of the isotheral and isocheimal lines from the parallels of latitude. The Northern Division presents the greatest variety of climate. On the sea-coast of New England, the influence of the ocean modifies the range of the thermometer and the mean temperature of the seasons. Advancing into the interior, the extreme range of temperature increases, and the seasons are violently contrasted. Having come within the influence of the great lakes, a climate like that of the sea-board is found; and proceeding into the region beyond the modifying agency of these inland seas, an excessive climate is again exhibited. The variations of the isotheral and isocheimal curves—the lines of equal winter and summer temperature—thus afford a happy illustration of the equalizing tendency of large bodies of water.

The chain of vast lakes or inland seas, lying in the course of the St. Lawrence, it is estimated, embraces an area of 93,000 square miles. Of amazing depth, these ocean-lakes, it has been computed, contain 11,300 cubic miles of water—a quantity supposed to exceed more than half of all the fresh water on the face of the globe.

The modifying influence of the sea-coast compared with the region beyond the lakes, is exhibited in the following table. It presents an average of five years, calculated from the data of two posts in each system of climate, the mean latitude of the posts on the ocean being 43°18′, and that of those in the opposite locality, 43° 10′.

Locality.	Latitude.	Mean Annual Temperature.	Range of the Thermometer			Winter.			Spring.			Summer.			Autumn.		
						December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.
						33 20	24.18	26.45	34.21	44.76	55.37	63 26	68.96	67.43	59.85	50.42	39.73
						25.07	18.82	21.78	34 20	48.05	64.49	75.04	76 81	73.92	60.85	52.92	37.43
Sea-coast	43°18′	47°.19	98	-24	122	27 94			44.78			66.55			50.00		
Region beyond the Lakes	43°10′	48°.99	104	-30	134	21.89			48.91			75.26			50.40		

In the former, the mean temperature of winter is 6°.05 higher than the latter; that of spring is 4°.13 lower; that of summer is 8°.71 lower; and that of autumn 0°.40 lower. This contrast is more strikingly shown by comparing the difference in the mean temperature of winter and summer, it being on the sea-coast 38°.61, and in the opposite locality 53°.37. It is thus apparent, that a classification of climates, having, for its basis mere latitude, is wholly inadmissible; for, although there may be little difference in the mean annual temperature, yet the distribution of heat among the seasons may be extraordinarily unequal.

These facts are still more strikingly illustrated in the following table, which exhibits a comparison between posts on the lakes and those of the same region situated beyond their influence.

Locality.	Latitude.	Mean Annual Temperature.	Range of the Thermometer.			Winter.			Spring.			Summer.			Autumn.		
						December.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.
						23.04	16.98	19.85	27.20	39 44	52.56	58.24	67.13	63.51	55.94	47.19	36.33
						18.07	13 74	20.35	31.90	44.81	62.42	71.53	76.49	72 07	58.47	50.81	36 31
Lakes	46°27′	42°.22	93	-26	119	19.96			39.73			62.96			46.49		
Remote from the Lakes	44°53′	46°.47	96	-26	122	17.42			46 38			73.26			48.53		

It thus appears that the winter of the former, notwithstanding it is 1°.46 north of the latter, has a mean temperature 2°.54 higher, whilst that of summer is 10°.40 lower. In the latter, the mean temperature of spring is 6°.65 higher, and that of autumn is 2°.04 higher. The difference in the mean temperature of summer and wi ı er, making due allowance for difference of latitude, is even greater than in the comparison with the Atlantic coast, that of the Lakes being 43°, and that of the opposite locality 55°.84. In the former region, the prevailing weather is cloudy, and in the latter fair; thus, during the year the proportion of days is—

	Fair.	*Cloudy.*	*Rain.*	*Snow.*
Remote from lakes,	216	73	46	29
Lakes,	119	132	67	47

Localities under the influence of the ocean or inland seas, do not exhibit great extremes of temperature, but the air is moist, and the changes of season are slow, uncertain and variable. On the other hand, the climate of localities, removed from such equalizing influences, is characterised by a great range of the thermometer, and a corresponding dryness of the atmosphere; the mean temperature of winter and summer is strongly contrasted, and the seasons change in constant and rapid succession. Other meteorological

phenomena are similarly modified by various causes. Thus in countries and seasons, in which solar action is most intense, electrical phenomena are most frequent and energetic; and whilst atmospheric moisture favours the passage of electricity from the earth to the clouds, the opposite condition causes its accumulation in objects on its surface. In the excessive climates just described, thunder and lightning are of rare occurrence, and terrestrial objects are charged with an unusual portion of electricity; whereas in the warm and moist atmosphere of the contrary localities, opposite phenomena are witnessed. The atmospheric dryness of the former pertains more particularly to latitudes above 40°; it is found, however, even in tropical countries remote from the ocean, more especially when high mountains intervene, condensing the moisture wafted by the winds from the sea; and in those regions in which currents of air traverse extensive tracts of arid soil, the dryness is extreme.

It is evident that the annual quantity of rain that falls upon any point of the earth's surface, depending, as it does, upon the amount of evaporation and the prevailing winds, is very intimately connected with the character of climate. The smallest quantity of rain generally falls in February and March, and the greatest amount in July, when the mean monthly temperature is highest. As a general rule, the annual quantity increases in proportion as the equator is approached, more especially in maritime localities and places in which ranges of elevated tracts skirt the sea coast; but as this augmented quantity falls at a particular season, and in a shorter space of time than in colder regions, the annual number of dry days, particularly in inland districts, is proportionally increased. In cold or temperate maritime localities, on the contrary, the rain, although much less in annual quantity, descends much more frequently, but in slighter showers. Consequently, the number of wet, foggy and drizzling days, is much greater than in warm and inland regions.

Conformably to these general laws, it is found that the climatic features of the coast of New England and of the region of the great lakes, exhibit a striking resemblance, whilst those of the third class of the same division are very dissimilar. The most characteristic feature consists in the distribution of heat among the seasons. These results have already been fully detailed. The climate of the third class, comprising the posts remote from the ocean and inland seas, is distinguished from the first two by great extremes of temperature, by seasons strongly contrasted, and a corresponding dryness of the atmosphere. The winters of this class, with the exception of the most southern posts, are characterized by extreme severity. From November to May, cold weather prevails, the ground being generally covered with snow to the depth of three or four feet, and the general range of the thermometer being from the freezing point to 30° below zero. The summers are equally remarkable for extremes of temperature. The heat is often as oppressive as in Florida, the mercury sometimes rising, in June, July and August, to 100°.

Fahrenheit in the shade. Unlike the two preceding classes, in which the air is moist, and the changes of the seasons more slow and uncertain, in this one, a constant and rapid succession is observed among the seasons, summer succeeds winter so rapidly that there is scarcely any spring, and vernal vegetation is developed with remarkable suddenness.

We possess no exact measurement of the relative quantity of rain that falls in our different systems of climate; and as no observations have been made upon the hygrometer, their relative degree of humidity cannot be determined. The ratio of fair and cloudy weather, in each system of climate of the northern division has been ascertained. The proportion of rainy and cloudy days on the ocean and the great lakes, it has been seen, is nearly twice as great as in the opposite localities; but there is no regular difference in the mean annual quantity of rain.

In the *Middle Division*, the two systems of climate bear the same meteorogical relation towards each other as the third class of the Northern Division does to the first two. Notwithstanding the extremes of temperature are much more modified in the Middle than in the Northern Division, the former is characterized by variableness, whilst in the latter a steady temperature predominates. Jefferson Barracks, near St. Louis, Missouri, shows a greater contrast in the seasons than Washington city; and on comparing Fort Gibson, Arkansas, with Fort Monroe on the coast of Virginia, notwithstanding the latter is 1° 32′ north of the former, a similar result is exhibited.

The *Southern Division* is characterized by the predominance of high temperature. Proceeding South from Canada to Florida, the seasons become more uniform in proportion as their annual temperature increases. This is strikingly illustrated on comparing the difference between the mean temperature of summer and winter at Fort Snelling, Iowa, and at Key West, at the southern point of Florida, the former being 55°.51, and the latter only 11° .34. The peculiar climatic character of this Division is distinguished less by the mean annual temperature than in the manner of its distribution among the seasons. This subject will be further elucidated when the climate of the peninsula of Florida comes under special consideration—a land in which the rigours of winter are unknown, and in which smiling verdure never ceases to reign.

In regard to the remaining elements of climate, such as the admixture of terrestrial emanations dissolved in atmospheric moisture, our positive knowledge is still more limited. This subject, intimately connected with febrile endemics, has little relation to the present inquiry. That mysterious agent—malaria—although too well recognised in its deleterious effects on the human frame, has hitherto remained inscrutable in its nature. Of the two systems of climate, the uniform and excessive, the influence of the latter upon man, breathing a dry, pure, and cool atmosphere, more especially in regions elevated high above the sea, is manifested in his being little subject to severe and malignant fevers; and although pulmonary diseases are more rife than

in any other system of climate,* he attains the maximum of the mean duration of human life. On the sea-coast, and the banks of lakes and rivers, or in low and narrow valleys, characterized by a deep, moist and rich soil, abounding with organic remains in a state of decomposition, the air is humid, sultry and relaxing, and loaded with noxious effluvia. The human frame is consequently imperfectly developed, the mortality of children is very great, and the mean duration of life is comparatively low. In the northern and temperate regions, however, maritime places are not less salubrious than inland districts. A locality, somewhat elevated, with an undulating surface, a well cultivated soil, and no marshes in the vicinity, presents the circumstances most favourable to health and longevity.

It is thus seen that there are many circumstances besides mere temperature, which enter into the constitution of climate. Amongst these, as influencing organized beings, one of the most important is the nature of *soil*, the formation of which has apparently been the result of the gradual attrition of the solid materials composing the crust of the globe. As all animals and vegetables, at least all land animals, are dependent for existence on this stratum of comminuted mineral substances and organic remains, its influence in regard, not only to mere health, but the organic modifications which the human frame experiences, constitutes an interesting subject of inquiry.

Having already demonstrated that the regions of the United States on the same parallels of latitude, present systems of climate very diverse in character, viz: 1. The regions bordering on the ocean: 2. Those under the influence of inland seas; and 3. Those remote from such controlling powers: it will be seen that these laws of climate maintain an intimate relation with the etiology of pulmonic diseases. It seems to be a well-established law, that the prevalence of *catarrh* and *influenza* in each *system* of climate, increases and decreases in proportion as the seasons are contrasted, thus maintaining an unvarying relation with the extreme range of the thermometer as connected with the seasons.

The following table presents in a condensed form, so far as regards the *catarrhal* form of pulmonic lesions, the result of the quarterly sick reports of 45 permanent posts, arranged in classes, comprising a period of ten years, the details of which are given in Abstract No. 1† of Appendix:—

* In the Northern Division of the United States, this law, it will be seen, is limited to catarrh and influenza.

† This abstract contains, besides the result of the permanent stations, that of 31 temporary posts in Florida. It is based on an aggregate mean strength of 47,220 and the period of observation extends from 1829 to 1838 inclusive. It exhibits the condensation of about 1500 quarterly reports of sick, and the mean strength of each post computed from monthly returns in the adjutant-general's office.

Ratio of Catarrhal Diseases.

Divisions.	Systems of Climate.	Latitude.	Dif. between the mean temp. of winter and summer.	Ratio treated per 1000 mean strength. First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Annual result.
North'n.	1st Class. Posts on the coast of N. Eng.,	43°18′	38°.61	63	49	36	85	233
	2d Class. Posts on N. chain of Lakes,	46°27′	43°.00	90	62	50	96	300
	3d Class. Posts N. of l. 39°, and remote from the ocean and inland seas,	44°53′	55°.84	175	120	86	169	552
Sou. Mid.	1st Class. From Del. Bay to Savannah,	37°02′	32°.99	102	45	23	97	271
	2d Class. South-western Stations, -	35°47′	36°.83	122	61	33	78	290
	1st Class. Posts on lower Mississippi,*	30°10′	24°.39	92	34	26	60	218
	2d Class. Posts in Peninsula of E. Flor.,	24°33′	11°.34†	45	24	40	33	143
	Total,			689	395	294	618	

These seven classes constitute certain systems of climate, each of which forms the boundary of a specific ratio in relation to pulmonary affections. The three grand divisions are:—1. The *Northern* region of the U. States, in which cold predominates, embraced in the first three classes of the table; 2. The opposite extreme, the *Southern* division, in which a high temperature prevails; and 3. The *Middle* region, the temperature of which vibrates to both extremes.

This table, which exhibits the annual and quarterly ratios of each system of climate, and serves to elucidate their relations and sequences, affords a beautiful illustration of the etiology of catarrhal affections as connected with the meteorological laws established. Take, for example, the northern division consisting of the first three classes:—On the New England coast, as the ocean modifies the atmospheric temperature the annual ratio treated per 1000 of mean strength, is as low as 233; on the great lakes, where a similar modifying influence is in operation, it is 300; whilst the third class, characterized by the extreme range of the thermometer, has a ratio as high as 552. But let us follow more narrowly the isotheral and isochimal lines, (representing the mean temperature of summer and winter,) which describe four curves within the same space, presenting alternately a *mild* and an *excessive* climate. As these lines, on the coast of the Atlantic, present comparatively little deviation from the terrestrial parallel, the ratio of catarrhal diseases is low; advancing into the interior, the line of equal summer rises and that of winter sinks, and the ratio increases proportionally; proceeding into the region of the lakes, the lines again converge beneath the controlling power of the waters, and the ratio of catarrh and influenza is modified

* For want of a better arrangement, Augusta Arsenal, Georgia, and Fort Mitchell, Alabama, have been included in this class.

† This result is obtained from the observations made at Key West. At Fort Brooke, Tampa Bay, it is 16°.02.

accordingly; again advancing into the interior beyond these ocean-lakes, the average rises in proportion as the isotheral and isocheimal curves tend to opposite directions. In the other grand divisions, the same law obtains. On the Atlantic coast, between the Delaware and Savannah river, the annual ratio is 271,* whilst the average of the interior posts, notwithstanding this class lies somewhat farther south than the former, is 290. As most of the posts of the first class of the southern division are on the Lower Mississippi, and are much under the influence of large bodies of water, the annual ratio is as low as 218; whilst the second class, which comprises the mild, insular climate of East Florida, has an average of only 143.

It would seem then that sudden atmospheric vicissitudes combined with moisture, do not excite a strong susceptibility to catarrhal diseases, else the sea-coast and the lakes should give a higher ratio than the dry and cold atmosphere of the opposite localities. The results, on every hand, afford satisfactory proof that the ratios of these lesions are highest, when the seasons are well marked, producing a decided impression upon the animal economy, and that they are less dependent upon daily variations of temperature than upon its extreme range as connected with the seasons.

In regard to the climate of the United States, the rule holds good, that wherever the seasons are violently contrasted the ratio of catarrh and influenza is highest, decreasing in proportion as the difference in the mean temperature of summer and winter grows less. Thus the ratio on the northern chain of lakes is little more than half as high as in the adjoining localities removed from the agency of large bodies of water; and accordingly, we find that the mean winter temperature of the latter, in the same latitude, is three degrees lower, and the summer temperature ten degrees higher, than the former, whilst the difference in the mean temperature of winter and summer is at least 16° less on the Lakes. Although we possess no exact measurement of the relative quantity of rain which falls in these two positions, nor any precise hygrometic observations; yet we know that the atmosphere of the lakes is much more moist, as the number of rainy and cloudy days is nearly twice as great as in the opposite locality.

Here then are several laws established in meteorology as applied to the etiology of disease. But let us test, by a further application of the principles, the universality of these physical laws. As the *middle* division is subject to the extremes of the northern and southern latitudes, so it is found to be prolific in pulmonic lesions in general. The result of eight military stations, (the 1st class of the middle division,) situated on the sea-coast and inlets between the Delaware and Savannah, gives an average of catarrhal diseases higher than that of the northern coast, where cold prevails, as well as that of more southern latitudes, in which a higher temperature predominates.

* In this class, Fort Monroe, and in the first class of the northern division, Fort Independence have been excluded, for reasons to be given in the sequel.

The annual ratio of the middle coast being higher than either extreme, let us see whether it bears the usual relation with the interior region of the same latitude. This refers to the south-western posts, of which Jefferson Barracks, lat. 38° 28′, is the most northern, and Fort Jesup, lat. 31° 30′, is the most southern point. True to the general law developed, we find that the ratio (290 to 271) is in accordance with the augmented difference in the mean temperature of summer and winter.

Before proceeding to the *Southern Division*, it will be necessary to remark that the statistics of Fortress Monroe, on the coast of Virginia, which seems to be under the influence of no ordinary laws, have been excluded in the calculation of the class to which it belongs. The ratios of catarrh and influenza per 1000 of strength, compared with the eight other posts of this class, stand as follows:—

	1st Quarter.	*2d Quarter.*	*3d Quarter.*	*4th Quarter.*
Fortress Monroe.	225	146	94	339
Remaining Posts.	102	45	23	97

It is thus seen that the averages are from two to fourfold higher than the mean ratios of the other posts of the same system of climate. Although the results are extraordinary, yet the influence of the seasons is strikingly manifest. The statistics of this post embrace a period of nine years; and whilst the nine fourth quarters, with an aggregate mean strength of 2625, give a total of 774 cases of diseases of the respiratory organs, 426 cases are reported in one of these quarters, with a mean strength of 609. Of these cases, 372 are registered as "Epidemic influenza," which continued to prevail until the following April. In the first quarter of this year, (1832) 259 cases of pulmonary disease are reported, 219 being "epidemic catarrh," in a command of 570 men; and in the second quarter, in a mean strength of 352, 154 pulmonic affections are reported, (126 being of the epidemic form,) most of which occurred early in the quarter. As these facts, however, are insufficient to explain the general result, much may have been owing to the agency of local causes; for example, the dampness of the men's quarters, which were in the casemates between the ditch of the Fort and the water of the Bay. On reference to Abstract No. 1, of Appendix, it will be seen that the contrasts are equally great in regard to pleuritis and pneumonia. It may be added that a large proportion of the deaths have arisen from this class of diseases. During the nine years, 102 deaths are reported in the medical returns, among which are 17 phthisis pulmonalis, 4 pneumonia, 3 pneumonia typhoides, 4 influenza, and 1 engorgement of the lungs. The average mortality from pulmonary diseases is about twice as high as at the remaining posts of this class.

The *Southern Division*, consisting of two classes, remains to be examined. The annual ratios of both these systems of climate are lower than that of any other. The first class of this Division is little removed from the

second of the *middle* division in point of latitude; but, owing to the modifying agency of the Gulf of Mexico, and the large lakes in the region of the Lower Mississippi, it holds an intermediate relation in respect to the south-western stations, and the climate peculiar to the peninsula of Florida. These annual ratios are as follows—290, 218 and 143. As the climate of East Florida is the most mild and equable, possessing all the advantages of the most favoured insular regions, so it presents the lowest average of catarrh and influenza.

The numerical results thus far obtained have been not in the least anticipated. If to enter upon an investigation free of preconceived opinions may be considered a merit, the claims, in the present instance, are still greater, inasmuch as the views of the writer were diametrically adverse to the conclusions warranted by the data; for we believed, with the rest of mankind, that the atmospheric moisture and sudden vicissitudes of temperature ascribed to positions on lakes and the ocean, exercise a greater agency than the dry and less variable climate of the interior, in the production of catarrhal diseases. Content to observe facts and to trace their relations and sequences, the author has essayed to be a faithful interpreter of nature; and as it is a leading principle of the inductive philosophy, to *ascertain the universality of a fact*, these researches will now be continued in a new direction.

Having obtained thus far unvarying results in regard to the annual average, I shall proceed to an investigation of the quarterly ratios as illustrative of the influence of the seasons. Having determined elsewhere the relative agency of the seasons in the causation of intermittent fever throughout the United States, I am enabled to say that catarrhal affections acknowledge this influence in a still more eminent degree. A single glance at the table of the "*Ratio of Catarrhal Diseases*" (p. 21,) will afford a satisfactory explanation. It will be seen that the ratios of the first and fourth quarters, in obedience to a general law, are always the highest, and that the third invariably presents the lowest average. The second class of the Southern Division, which exhibits an apparent exception to this rule, the third quarter having a higher ratio than the second or fourth, it will be found, illustrates the ancient axiom—*exceptio probat regulam.* As the Peninsula of Florida affords no marked distinctions of seasons, as will be shown more fully, it follows that amongst the causes which determine the prevalence of catarrhal lesions, those that are secondary in the other systems of climate, become in this the primary ones. Finally, the aggregate of each quarter, which gives a fair expression of the relative influence of the seasons in the etiology of catarrh and influenza throughout the United States, as shown in the same table, affords satisfactory demonstration of the general laws developed. These ratios stand as follows;

1st Quarter.	*2d Quarter.*	*3d Quarter.*	*4th Quarter.*
689	395	294	618

These facts having been determined, the advantage of a winter residence

in a more southern latitude to a person labouring under *chronic bronchitis*, becomes at once apparent. If he can avoid the transition of the seasons—that meteorological condition of the atmosphere, which stands first among the causes which induce catarrhal lesions, he will do much towards controlling his malady. Let us suppose him on the coast of New England, in the 3d quarter, the ratio being as low as 36, when the sudden transition of the season brings it up to 85. The consequences will inevitably be an aggravation of that disorder to which he is predisposed; for the respiratory organs, even when healthy are peculiarly susceptible, at this season, to abnormal action. Let us, on the contrary, suppose him gradually moving south with the change of the season, and the 4th quarter will find him in a climate whose ratio is even lower than that of the preceding quarter in the region which he had left. On the coast of New England, the ratio of the 3d quarter is 36, and that of the fourth is 85, whereas the average of the latter quarter in peninsular Florida is only 33. These are not isolated facts, but uniform results obtained from ten years' observation. As the same law obtains in every system of climate, it is easy to apply the remedy.

The assemblage of morbid phenomena, usually designated by the term *consumption* or *phthisis pulmonalis*, it is well known, may arise from various pathological conditions of the respiratory organs. In a practical point of view, it is important to discriminate these several affections. Varying much in the degree of sanability, it is generally conceded that that form of consumption which depends upon chronic bronchial inflammation, is by far the most under the control of remedial management. Recoveries are not uncommon in those cases in which the mucous tissue remains free from ulceration, or the subjacent pulmonic structure has not become consolidated.

As regards the advantages of change of climate, it will be observed that reference is made only to *chronic bronchitis* as a natural consequence, notwithstanding the inference, that similar effects, reasoning from analogy, would follow in other forms of consumption, might be warranted. As it is, however, the catarrhal or pituitous consumption of authors that probably constitutes the majority of the reputed cases of phthisis pulmonalis in northern latitudes, and as this is the only form that can be really considered remediable, the importance of determining the comparative influence of season and climate in relation to catarrhal lesions, becomes more strikingly manifest.

As the doctrines maintained are conclusively established, a further discussion were useless. But this subject, at the present day, is invested with more than ordinary interest, by reason of the conclusions deduced from the "Statistical Reports on the Sickness, Mortality and Invaliding" among the British troops stationed in every quarter of the globe. In regard to *phthisis pulmonalis*, the reporter shows by numerical results, that it is more prevalent in southern than northern latitudes, and that it is "*by no means likely that any beneficial influence can be exerted by climate itself*" in pulmonary

affections. The conclusion that pulmonic lesions, as regards the annual ratio, are more prevalent in certain *systems* of climate in southern than northern latitudes, is confirmed by the statistics of the United States army; but as we proceed in the investigation of this question, in relation to the relative influence of the *seasons*, the general opinions in regard to change of climate in pulmonary affections, maintained since the days of Hippocrates, will be triumphantly established. Major Tulloch, in his able reports, has in some measure, set the world right in regard to a *theoretical* error, but has, unfortunately led it, at the same time, into a *practical* one.* It is thus seen that his deductions are vitiated by the radical error of basing them on the *annual* results without reference to the influence of the *seasons;* and, did space permit, it were easy to show that the inferences deduced from his numerical results are, in many instances, unwarranted, as he has fallen into the error not only of taking the mean of the averages given by the stations of a command, but into that of comparing the lowest average in one command with the highest in another.

It is not, however, pulmonary diseases alone that augment and diminish with the varying seasons—a fact established by the result of statistical data. The prevalence of a specific disease, or a class of diseases, constitutes a morbid *diathesis*, which modifies the character of all other lesions. In our northern and middle States, pulmonary diseases constitute the prevailing *diathesis* in the first and last quarters of the year, whilst, in the second and third quarters, the ratio is not more than one third as high as the average given by the diseases of the digestive organs. An invalid labouring under chronic bronchitis is, therefore, on the accession of the fourth quarter, doubly subject to renewed attacks; whereas by going south in the latter part of the third quarter, he leaves a region in which diseases of the digestive organs are the reigning lesions, and enters another of the same character; and as his system has not been acted upon by the long continued heats of a southern summer, he is less susceptible than the residents, to the influence of those causes which induce pulmonary affections. The pulmonic of the south, to enjoy the full benefit of his own climate, must, therefore, spend his summers in more northern latitudes. In Florida, malarial diseases constitute the morbid diathesis in every season; and if the old idea, that the air of a marshy country is beneficial in consumption, be but partially true, then,

* The opinion that it is worse than useless to visit southern regions in pulmonary diseases, has been very generally embraced on the strength of these statistics. The following extract from the Med. Chirurg. Review, may be given as an example:—These reports "*have given the death blow to the expatriation of invalids affected with pulmonar alterations.* They serve also to show us the salubrity of our calumniated climate, and t lower our aspirations for that 'sweet south,' whose sunny skies and luxuriant plains tc commonly smile but to betray. Statistics dispel those illusions of poesy, and even pro that consumption, the reproach of our fickle seasons, lurks as fatally in the balmy Itali zephyr, or the sultry tropical breeze."

indeed, must this climate be an infallible remedy. It will be seen, however, that among northern troops, stationed at the south through all seasons, consumption of a tubercular nature frequently supervenes upon febrile diseases, more especially in constitutions broken down by intemperance, standing in the relation of those other sequelæ—dropsy, jaundice, and the various chronic lesions of the viscera.

I have thus concluded the investigation of catarrhal diseases in reference to the agency of season and climate; and the results, it is conceived, demonstrate conclusively the advantage of a winter residence in the peninsula of Florida in cases of *chronic bronchitis.* In endeavouring to determine, by ordinary observation, the influence of meteorological causes in relation to disease, the difficulties of the inquiry are very great, owing both to the complexity of the agents concerned and that of the organs and functions upon which they act. Independently of incidental miasmata, whether gaseous admixtures, animal or vegetable products, or other agents still less within our knowledge, this inquiry naturally divides itself into four heads—viz: *The Temperature of the Air—Its Hygrometrical Condition—Its Weight —and Its Electrical State and Changes.* The agency of winds may be referred, in a great measure, to some one of these conditions. Although little has been done to determine the influence of light, yet seeing what has been effected by science in expounding the physical conditions through which this great agent operates, and its effects, for example, on the growth and economy of plants, many of its relations to the body, there is reason to believe, will be hereafter ascertained. The present inquiry embraces in its scope the temperature of the air and, in some measure, its hygrometrical state. Although we feel these various agents to be in perpetual operation, yet it is singular how little real knowledge has been gained in relation to their connection with disease, The difficulty of the research is mainly enhanced by the circumstance that none of these conditions act singly upon the living body; and to meet the perplexity of these questions, meteorology, which is itself only taking a place among the exact sciences, has not yet accomplished much. To determine these laws, the personal observations of a single individual cannot be of much avail. It is only by extending these observations through a series of years and over vast masses of individuals, upon the principle of the numerical mode of analysis, that correct conclusions can be attained. It has just been seen that by the application of the doctrine of averages, important relations have been disclosed discoverable in no other way. The progress of physical science, it is thus seen, is ever lending fresh aids to that of pathology; and judging from the character of the results now developed, a favourable augury of the future, as the range of meteorological science, aided by new instruments, is being enlarged, is justly warranted.

I shall now proceed to the investigation of the laws which obtain in regard to *pleuritis and pneumonia.* As these lesions, it is very probable, are

dependent upon the same metereological causes, the results will be investigated conjointly. In abstract No. 2 of Appendix, the relative prevalence of each is exhibited. The following table presents the quarterly and annual ratios of pleuritis and pneumonia in each system of climate:—

Ratio of Pleuritis and Pneumonia.

Divisions.	Systems of Climate.	Ratio treated per 1000 of mean strength. First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Annual Results.
Sou. Mid. North'n.	1st Class. Posts on the coast of New England, -	12	11	8	10	41
	2d Class. Posts on Northern chain of Lakes, - -	11	15	13	11	49
	3d Class. Posts north of lat. 39°, and remote from the ocean and inland seas, - - - -	14	11	7	12	45
	1st Class. Coast from Delaware Bay to Savannah, -	21	11	8	16	57
	2d Class. South-western Stations, - - - -	46	18	10	20	92
	1st Class. Posts on the lower Mississippi, - -	20	9	4	11	47
	2d Class. Posts in the Peninsula of East Florida, -	14	9	8	6	39
	Total,	138	84	58	86	

It hence appears that the laws in regard to pleuritis and pneumonia, as expressed by the numerical results, differ, in some points, from those peculiar to catarrhal diseases. In the three classes of the Northern Division, the modifying agency of the ocean and lakes, is not manifested in the results. In the other systems of climate, the laws are the same as in catarrhal affections; thus, the difference between the two classes of the middle division is very striking, whilst those of the southern division exhibit a remarkable decrease in the annual ratio. An examination of the quarterly averages as illustrative of the influence of the seasons, compared with catarrh and influenza, will also show some variation. In the first three classes, notwithstanding the third quarter is the lowest, the agency of the seasons is not very manifest. In all the others, the difference is very striking; and in taking the total of each quarter, which affords a fair expression of the relative agency of the seasons in the causation of pneumonia and pleuritis throughout the United States, it is found that the law is the same as in catarrhal diseases, the first and fourth quarters presenting the highest, and the third, the lowest average. Thus:—

1st Quarter.	*2d Quarter.*	*3d Quarter.*	*4th Quarter.*
138	84	58	86

In these calculations, Forts Monroe and Independence have, as before, been excluded. On reference to Abstract No. 2 of Appendix, the relative prevalence of these diseases at each of these posts may be seen. At Fort Independence, the total of pleuritis and pneumonia is eight times as high as

that of catarrh, whilst the ratio of the former is nearly twenty times as high as that of the remaining posts of this class. As but one death is reported among 261 cases of pleuritis and pneumonia, it is reasonable to presume that a great majority belonged to the class of catarrhal affections.

From the table just given, it appears that the average of pleuritis and pneumonia is much lower in the cold and variable climate of our northern and eastern States than in the middle and southwestern regions of the United States. At the southwestern posts the annual ratio is 92, whilst on the coast of New England it is only 41. In catarrhal affections, the same law obtains so far as the New England coast is concerned; but the second, and especially the third class of the northern division exhibit contrary results. It has been seen that catarrhal lesions in every system of climate obey the law in respect to extremes of temperature as connected with the seasons. In pleuritis and pneumonia, this law receives some modification; for example, the third class, comprising the posts in the northern division, remote from the ocean and inland seas, has a ratio only half as high as that of the southwestern stations. At Fort Snelling, Iowa, in the former class, the difference in the mean temperature of winter and summer, is 55°.51; whilst at Fort Gibson, Arkansas, in the latter, it is only 36°.83. In the former, the summers, although the mercury rises very high, are short; but in the latter the summer heats are both great and long continued. It would seem to be a law that in proportion as the high temperature of summer makes an impression upon the system, do the lungs become susceptible to the morbific agency of the opposite seasons. In the northern division, for example, as cold predominates, and no decided impression is made upon the animal economy by the short summer, the annual ratio of pleuritis and pneumonia is not only low, but there is little difference in the ratios of the seasons; on the other hand, at the southwestern posts, remarkable for high and long continued summer heats, the annual ratio is about twice as high as in the northern States, whilst the difference in the seasons is very considerable, the ratio of the third quarter being less than one ninth of the annual average. This contrast is rendered still more striking by the fact, that whilst the ratio of the first quarter is nearly four times higher at the southwestern than at the northern posts, there is no difference in the averages of summer. At Fort Gibson—a point at which the mercury rises higher than at any other post in the United States, the averages stand thus:—First quarter 71; second quarter 19, third quarter 9, fourth quarter 15, the annual ratio being 112. On comparing the southwestern stations with the corresponding posts on the Atlantic, the general law in reference to the modifying agency of the ocean is strikingly manifested. In the first class of the southern division, as the seasons grow less contrasted, the annual ratio decreases materially; and lastly, in the remaining class (East Florida), in which, for example, at Fort Brooke and at Key West, the difference in the mean temperature of winter and summer is respectively only 16°.02 and 11°.31, the lowest average is

presented. It is thus seen that in regard to pleuritis and pneumonia, it seems necessary to consider not only the degree of contrast in the seasons, but the duration of high temperature. Leaving out of view the three classes composing the northern division of the United States, the law is precisely the same as in catarrhal lesions.

The subject of *phthisis pulmonalis* will next engage attention. The quarterly and annual averages, in each system of climate, are shown in the annexed table:—

Ratio of Phthisis Pulmonalis.

Divisions.	Systems of Climate.	Ratio treated per 1000 of mean strength.				
		First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Annual Results.
North'n.	1st Class. Posts on the coast of New England,	2	3	2	3	9*
	2d Class. Posts on Northern chain of Lakes,	3	2	2	2	9
	3d Class. Posts north of lat. 39°, and remote from the ocean and inland seas,	2	1	1	1	5
Mid.	1st Class. Coast from Delaware Bay to Savannah,	4	5	2	3	13
	2d Class. South-western stations,	3	3	4	2	11
Sou.	1st Class. Posts on the lower Mississippi,	3	3	2	2	9
	2d Class. Posts in the Peninsula of East Florida,	2	2	2	2	9
	Total,	19	19	15	15	

It would not appear that any general laws can be deduced from these numerical results. In the northern division, the average of the third class, contrary to the general results of the class of diseases of the respiratory organs, is much the lowest: but this difference is more apparent than real, from the circumstance that nearly all the fatal cases of consumption in this division are ascribed to the abuse of ardent spirits. In the third class, for example, were the results of West Point, a command consisting mainly of officers and cadets, excluded from the calculation, the annual ratio of cases per 1000 rises nearly to 7; and the difference still existing is doubtless owing to the greater facility of obtaining, at the posts along the sea-board, inebriating potations. It is more than probable that the ratio of chronic bronchitis, follows the laws which obtain in respect to catarrhal lesions; but in regard to phthisis pulmonalis in general, these laws cannot be recognised. It is an important fact that whilst the averages of catarrh and influenza, pleuritis and pneumonia, in the first class of the middle division are reduced nearly 50 per cent. by excluding Fort Monroe, the ratio of phthisis pulmonalis is increased. It confirms the opinion that this disease, although much under

* As fractions are not given, and as the mean strength of each quarter varies, the annual results do not always correspond with the total of the quarterly ratios.

the influence of season and climate, is still more, especially among troops, under the control of other agents. As all causes by which the energies of the human frame are sapped, conduce to the development of the tubercular form of consumption, so northern constitutions exposed to the chronic diseases and debilitating heats of a southern latitude, acquire a peculiar susceptibility. In systems broken down by habits of intemperance, it is very apt to supervene upon certain chronic affections, as the sequela of remitting and intermitting fever, diarrhœa, &c. Facts of this kind having relation to the annual results, without reference to the influence of the seasons, it has been seen, led the British reporter into the erroneous conclusion that no change of climate is beneficial in any form of consumption.

The *annual* results in regard to the class of pulmonary diseases, as well as the mortality from each, now come under investigation. As the cause of every death is not specified in the quarterly sick-reports, a correct result in respect to the mortality can only be approximated. The total of deaths given in the following table are those only which occurred among men on the sick list—a ratio considerably lower than that of the post returns which include the deaths from all causes:

Northern Region of the United States.	Mean Strength.	Ratio of cases per 1000 of mean strength.					Deaths.						
		Catarrh and Influenza.	Pneumonia.	Pleuritis.	Phthisis Pulmonalis.	Total.	Catarrh and Influenza	Pneumonia.	Pleuritis.	Phthisis Pulmonalis.	Hæmoptysis.	Total per Medical Returns.	Causes not specified.
Atlantic Posts, - - - -	3130	233	22	26	9	290		1		15		140	16
Posts on the Lakes, - - -	5973	300	19	30	9	358	1	4		9		65	12
Posts remote from the ocean and the Lakes, - - - - -	12604	552	17	28	5	602		3	1	22	1	119	16
Total,	21707	439	18	28	7	490	1	8	1	46	1	324	44
Southern Region.													
Coast from Delaware to Savannah,*	3199	271	25	32	13	341		1	1	19		196	18
South-western Stations, - -	11140	290	39	52	11	392		31	2	61	2	478	75
Posts on the lower Mississippi, -	3381	218	22	28	9	277		2	2	10		178	30
East Florida,	4607	143	15	24	9	191			1	9		131	17
Total,	22327	246	29	40	10	326		34	6	99	2	963	140

* Fort Monroe, as before, so far as pulmonary diseases are concerned, is excluded from this class. There are reported 102 deaths, of which 4 arose from influenza, 8 from pneumonia, and 17 from phthisis pulmonalis.

It is thus seen that, with the exception of catarrh and influenza, the annual ratio of pulmonary diseases is lower in the northern than in the southern regions of the United States. It is in the middle districts of the United States, however, that pneumonia, pleuritis, and phthisis pulmonalis, are most prevalent, the peninsula of Florida having a lower average than any other region. It is found too, that the same law obtains in regard to the mortality arising from this class of diseases, the deaths per 1000 of mean strength being as under:—

	Phthisis Pulmonalis.	*Pneumonia, pleuritis, and catarrh.*
Northern Region.	2.1	0.5
Southern "	4.4	1.8

For the purpose of comparison, these results are deemed sufficiently accurate; but it is necessary to mention, as appears by the table, that among the deaths in the Northern Region, the causes of about one eighth, and in the Southern, the causes of one-seventh are not reported. It is known, however, that the majority of the deaths, the causes of which are not specified, belongs to the class of casualties.

The high mortality of the southern regions is caused by the Middle Division of the United States, the average on our southern coast being comparatively low. Taking the statistics of the posts in East Florida, and those on the Lower Mississippi, the ratio of phthisis pulmonalis is found to be only 1.7, and that of the remaining lesions of this class to be no more than 0.7 per 1000 of mean strength. It is also ascertained that these diseases are of a more fatal tendency in the Southern than in the Northern Regions. In the latter, the ratio of mortality from phthisis pulmonalis is 32, and in the former, 42 per hundred cases; and as regards pleuritis and pneumonia, the difference is much greater, the average mortality in the Northern being 9, and in the Southern, 26 per thousand cases. It is necessary to add, however, that this high mortality is limited to the south-western posts, 33 deaths, (out of 40—the total of the four southern classes,) being reported in this class.

These statistics then show that as regards pneumonia, pleuritis, and phthisis pulmonalis, the ratio of cases and deaths is greater in our middle regions, including the south-western stations, than at either extreme. In endeavouring to account for this result, much may, perhaps, be due to the circumstance that the subjects are generally from the Northern States, or from Europe. It may be safely asserted, as has been already remarked, that the majority of cases of consumption at our southern posts supervene upon febrile diseases, more especially in constitutions broken down by intemperance, bearing the same relation to fevers as those other sequelæ—dropsy, jaundice, and the various chronic lesions of the viscera. On the Lower Mississippi—a class of posts which presents the highest mortality—the average of phthisis pulmonalis is low, owing very probably to the circum-

stance that fevers are of the most fatal tendency, terminating either in speedy death or rapid recovery. At the south-western stations, and those along our middle coast, the malarial poison acts more slowly, thus developing, by a gradual deterioration of the constitution, a tubercular form of consumption. It follows then that a continuous residence in the south, so far from being beneficial in this disease, will often hasten its fatal issue. This fact does not, however, in the least militate against the doctrine which maintains that advantage will be derived from change of climate in the way of a winter residence; and so far as regards the propriety of the measure in *chronic bronchitis*, no reasonable doubt can be entertained.

Reference has already been made to the British army statistics, the results of which, it is alleged, show "a striking contradiction to the popular idea" in relation to pulmonary diseases. The conclusion of the reporter that this class of diseases is more prevalent in southern than northern latitudes, it has been seen, is the result of hasty generalisation. It has been demonstrated, for example, that the prevailing low temperature of the coast of New England, and the predominating high temperature of our southern coast, present each a lower ratio than the variable climate of the intervening region, characterized by the extremes of both. Having averred that the reporter's deductions are in many respects unwarranted by the numerical results, a proper respect for the opinion of others, more especially when emanating from high authority, requires, so far as the limits of this paper will admit, a statement of the general grounds upon which this declaration rests.

England has been assumed as the standard of comparison. Now, it is well known that the range of the thermometer is not greater in England than in Italy, and that the difference in the mean temperature of summer and winter is actually less. In regard to the difference of winter and summer, the ratios stand thus:—Penzance 15°.84, Edinburg 17°.90, London 23° .20, Italy 27°.26 and southwest of France 26°.42. In our own country, the results are very different, as Fort Snelling, Iowa, 55°.51, Fort Brady, Mich., 40°.87, Washington city 38°.98, Jefferson barracks, Missouri, 41° .17, Fort Gibson, Arkansas, 36°.83, Augusta Arsenal, Georgia, 30°.55, Fort Brooke, Florida 16°.02, and Key West 11°.34. As the summer heats of England never rise so high or are so long continued as to render the animal economy very susceptible to the influence of the opposite conditions, it follows that the ratio of pulmonic lesions must be low. When this fact is taken in connection with another just developed, viz; that positions bordering large bodies of water, by which the extremes of temperature are moderated, whilst the air is moist and the seasons characterized by variableness, exhibit a lower ratio of pulmonary diseases than localities under opposite circumstances, the selection of England as a standard of comparison, illustrates strongly the impropriety of basing a classification of climates on mere latitude.

The reporter takes the ground that a comparison of the ratio annually

attacked out of a given number in different countries, presents the most accurate method of determining the relative agency of climate in the causation of particular diseases, more especially if these investigations extend over a long series of years, and include large masses of individuals. Now, this remark is true, provided the comparisons, unlike the various British commands, are instituted among the natives of each region.

The reporter has fallen into the error of comparing the *lowest* average in one command with the *highest* in another, by which all his deductions in reference to pulmonary diseases have become vitiated. The fallacy of the conclusion that pulmonary consumption is more prevalent and fatal in the West Indies than in England, appears from the single fact that he dwells particularly upon a comparison of the results afforded by the Windward and Leeward command of the former, and the Dragoon guards and Dragoons of the latter, thus assuming, on the one hand, the *highest*, and on the other, the *lowest* mortality as comparative averages. The high ratio of the Foot Guards in England is set aside as "an exception," because it appears "attributable to other causes than the climate of the metropolis," whilst that of the Windward and Leeward command stands forth in bold relief, notwithstanding he thinks it "not attributable to climate only, but also to some peculiarity from which officers are exempt." Taking the aggregate strength and aggregate mortality from diseases of the lungs of all the white troops in the West Indies and of all the commands in the United Kingdom, the result is in favour of the former. Were even the mortality higher than in England, it would not be surprising; for here are men, from a foreign land, exposed, through all seasons, to a continuous high temperature. As pulmonary consumption, in hot climates, is doubtless often induced by the deterioration which the constitution, especially in cases of intemperate habits, undergoes from repeated attacks of febrile and dysenteric lesions, a prolific source of mortality is presented in the West Indies. As the prevailing idea in regard to the advantages of acclimatization is disproved by statistical investigations, not only in the West Indies, but all other climates in which British troops are stationed, it follows that the causes assumed as exercising a powerful agency in the production of phthisis pulmonalis, in proportion as the conservative powers of the constitution give way, are uniformly progressive in their fatal tendency.

At first view, the advantage of a winter residence in the West Indies to a pulmonary invalid, may seem problematical; but this deception vanishes when we call to mind the fact that these diseases, as a class, are more under the influence of the seasons than intermitting fever. A continuous residence in these islands would no doubt hasten the fatal issue in a case of tubercular consumption, but the objections on this score are wholly limited to the summer season. Although the reporter remarks on "the baneful influence of the climate of the West Indies in accelerating the progress of consumption, yet it is found that the annual ratio of mortality from hæmoptysis a

phthisis pulmonalis is only 6.1 per 1000, exclusive of those sent home as invalids, whilst that of the United Kingdom is 8.2. Now could we institute a comparison between the civil population of England and the natives of the West Indies, correct results might be obtained.

If we compare the ratio given by all the commands in England with that of the Mediterranean commands, Gibraltar, Malta and the Ionian Islands—the result, contrary to every conclusion of the reporter, is decidedly favourable to the latter. In the United Kingdom, the annual ratio of mortality from hæmoptysis and phthisis pulmonalis is 8.2 per 1000 of the strength; whilst at Gibraltar it is only 3.6, at Malta 3.7, and at the Ionian Islands 2.9, but as some consumptive patients in the Mediterranean commands were invalided, these ratios are somewhat too low. In regard to the civil population of Malta, the reporter adds:—"Nor is the fatal influence of diseases of the lungs confined to the troops alone; it extends in a corresponding degree to the inhabitants." It will be observed that deaths are reported by the Maltese medical practitioners under the different heads of consumption and phthisis pulmonalis. "The former," the reporter says, "is understood principally to refer to that class of consumptive cases more generally designated *marasmus*, which term has been adopted in the returns since 1831. They are understood to have occurred *principally among children and old persons*." Not content to include under the class of diseases of the lungs the cases of marasmus reported as consumption prior to 1831, he also takes those *reported as marasmus* subsequently to that period. Excluding the cases of marasmus, the ratio of mortality from hæmoptysis and phthisis pulmonalis is reduced to 1.1, and that from all diseases of the lungs, to 3 per 1000. The fatality of pleuritis and pneumonia is not half so great as among the troops. Consequently, the mortality from all diseases of the lungs among the civil population is not more than half as high as among the troops, and not one third as great as the average of the several commands in the United Kingdom. As truth never lies in extremes, so the ratio of hæmoptysis and phthisis pulmonalis, including *one half* of the cases of marasmus, is 2.2, which is much lower than among the military, and only one-fourth of the average in England.

This view of the results of the several Mediterranean commands, leads to conclusions diametrically adverse to those deduced by the reporter. So far from the climate being unfavourable to persons predisposed to pulmonary diseases, it is satisfactorily shown that it is even advantageous as a continuous residence. Hence, to the pulmonic invalid of more northern latitudes, who seeks this climate merely as a winter retreat, the beneficial results must be incalculable. Were even the correctness of the reporter's deductions admitted, it would not militate against the principles established in relation to the influence of the seasons. In no event, then, can the pulmonic of England be in error, in visiting the Mediterranean as a winter residence.

In Nova Scotia and New Brunswick, as well as in Upper and Lower

Canada, the ratio of admissions and deaths from diseases of the lungs is considerably below that of the United Kingdom. As this is a region in which cold predominates, the result is no ways surprising; for, notwithstanding "the variation sometimes exceeds 50° in the course of a few hours," it is in harmony with, and thus confirms the laws established in relation to, the systems of climate pertaining to the United States.

The results given by Major Tulloch's latest statistical Reports "on the sickness, mortality, and invaliding among the troops in Western Africa, St. Helena, the Cape of Good Hope, and the Mauritius," afford no confirmation of his favourite views in regard to pulmonary diseases. We are told, for example, "that among 71,850 native troops serving in the Madras Presidency, the deaths by every description of disease of the lungs did not, on the average of five years, exceed *one per thousand* of the strength annually. Here then, unlike the island of Malta, is presented a fair standard of mortality from all pulmonary diseases among native troops; and compared with the ratio of Great Britain, it is found to be only one-tenth as high. On the western coast of Africa, the ratio of mortality from diseases of the lungs among British troops, is 4.9 per 1000, in St. Helena 3.2, and at the Cape of Good Hope 3.9, whilst at the Mauritius, the average is nearly twice as high as the last. As the ratio of the United Kingdom is 10.1, these results, like all others, are much in favour of southern latitudes. The ratio of admissions by the class of pulmonary diseases is much the same at the Cape of Good Hope and the Mauritius, the great source of mortality in the latter arising from consumption. This fact confirms the oft-repeated opinion, that the ratios of phthisis pulmonalis in general and the other diseases of the lungs have no apparent relation.

These general conclusions are confirmed by statistical facts in a recent edition of M. Laennec's work, edited by M. Andral. It is found that phthisis, as in the middle regions of the United States, is much more frequent in the temperate regions of Europe, comprised between the 55th and the 45th degree of latitude, than it is further to the north. Whilst in London it is calculated that 236 of every 1000 deaths is caused by pulmonary phthisis, in Sweden the ratio is only 63. At St. Petersburg and Stockholm, it is much less destructive than throughout Germany, and more especially at Berlin, Munich, Vienna, and Paris. In the southern parts of Europe, from the 45th to the 35th parallel, it is still found to be a very common disease. That a cold temperature is not essentially *per se* favourable to the developement of phthisis pulmonalis, as well as pleuritis and pneumonia, seems, therefore, an established point.

No attempt is here made to analyze critically the results of the British statistics, but rather to adduce the foregoing facts in confirmation of the doctrines established in reference to the systems of climate pertaining to the United States. In the British Commands investigated, the reporter had to deal entirely with regions characterised by a mild insular climate, or those

in which a low temperature predominates; and as the contrasted seasons of an excessive climate like ours was not brought under his observation, his means of arriving at truth were restricted. Even when referring for illustrations to the countries of other nations, he falls into a like error; for when discussing the climate of Malta in relation to pulmonic affections, he refers to Sweden as a region which ought to afford opposite results. Now had returns from the middle regions of Europe fallen into his hands, the deductions, it has just been seen, would have been widely different. And here again, we have meteorological facts that afford mutual corroboration. Moscow, for example, in lat. 56°, according to Humboldt, has the same mean summer temperature as Loire in France, in lat, 46°; and in Scotland, in lat. 57°, the winters are more mild than at Milan, in lat. 45° 28.'

As *rheumatism* pertains to that class of diseases for which a winter residence in southern latitudes is often recommended, a few inquiries in regard to its etiology will be instituted. This subject, like the preceding one, is of such a nature that the experience of the civil practitioner is on too limited a scale, and too immethodical in its character, to warrant general conclusions, and although generally unsafe to disagree with mankind in matters of daily observation, yet it would not be surprising were the commonly received opinions upon a question of such magnitude, to prove, when submitted to the test of numbers, to be founded in error. The following table, condensed from abstract No. 1 of Appendix, exhibits the annual and quarterly ratios of rheumatic cases, treated per 1000 of strength, on an average of 10 years, in each system of climate:—

Ratio of Rheumatic Diseases.

Divisions.	Systems of Climate.	Ratio of cases per 1000 of strength.				
		First Quarter.	Second Quarter.	Third Quarter	Fourth Quarter.	Annual Ratio.
North'n.	1st Class. Coast of New England, - - - -	24	28	29	30	110
	2d Class. Posts on Northern chain of Lakes, - -	41	37	36	38	151
	3d Class. Posts north of lat. 39°, and remote from the ocean and inland seas, - - - - -	45	48	37	34	166
Sou. Mid.	1st Class. Coast from Delaware Bay to Savannah, -	37	36	27	24	126
	2d Class. South-western stations, - - - -	36	31	20	27	112
	1st Class. Posts on the lower Mississippi, - -	28	16	22	23	90
	2d Class. Posts in the Peninsula of East Florida, -	38	23	30	26	119
	Total,	249	219	201	202	

It thus appears that these diseases, which are generally ascribed to sudden variations of temperature conjoined with excess of moisture, are less under the influence of atmospheric agency than is commonly supposed. It is evident, however, that these affections are, in some measure, controlled by

the same laws which govern pulmonary diseases. Were cold, moisture, and sudden alternations of temperature, powerful exciting causes, the highest ratio should be given on the New England coast and the northern chain of lakes; on the contrary, it is found that, like pulmonic lesions, the disease is most rife in the dry and cold atmosphere of the interior, (the third class of the Northern division,) characterised by the extreme range of the thermometer and by seasons strongly contrasted. In the middle division, the first class, it is true, is higher than the second; but if the results of Fort Monroe, as in the calculations in regard to pulmonary diseases, are excluded, the annual average of the former is reduced to 93. In the northern division, the annual ratio of cases, per centum of the strength, is 15, whilst the mean of the middle and southern division is 11. Among 6257 cases registered, only one death is reported.

Were these affections much under the influence of meteorological causes, so far as regards variations of temperature, we should find, as in pulmonic lesions, a great contrast in the ratios of the seasons. Taking the totals of the four seasons, as shown in the table just given, the first and second quarters give the highest averages; but, contrary to the law which governs pulmonary diseases, the ratios of the third and the fourth are the same. Viewing the whole subject, however, it is found that a similarity obtains in the general laws which, on the one hand, govern rheumatic, and, on the other, pulmonary, but more especially catarrhal diseases.

These views are confirmed by the results given in the following abstract from the recent reports upon the medical statistics of the British troops:—

Admissions from Rheumatic Affections annually per 1000 of mean strength,	Jamaica.	Nova Scotia and New Brunswick.	Bermudas.	Malta.	Ionian Islands.	Gibraltar.	Canada.	Mauritius.	Windward and Leeward Command, West Indies.	United Kingdom.	Cape of Good Hope.
	29	30	33	34	34½	38	40	46	49	50	57

The reporter here directs attention to the fact that rheumatic diseases are more prevalent in the Mediterranean than in Canada and Nova Scotia, and that "though some of the provinces of the Cape of Good Hope have occasionally been without rain for several years, these diseases are more frequent in the dry climate of that command, than in the West Indies where the condition of the atmosphere is as remarkably the reverse; yet have extreme cold and atmospheric vicissitudes, coupled with excess of moisture, been assigned as satisfactory causes for their prevalence." Between the ratio of Canada and that of Nova Scotia and New Brunswick, the former being one

third higher than the latter, the same law obtains as in the United States. Whilst in Canada the cold becomes so intense that the mercury congealed in the thermometer, serves no longer to indicate the extreme reduction of the temperature; in Nova Scotia, on the contrary, the mercury is seldom lower than 6° or 8° below zero in winter, or above 88° in summer—a modification arising from the insular character of the province, which is likewise so much intersected by lakes and bays, that nearly one third of its surface is under water. Notwithstanding the atmosphere is consequently exceedingly moist, and fogs are along the coast common throughout the year—a circumstance regarded as most favourable for the production of rheumatism—yet it is seen that the ratio is lower than in the dry and intensely cold climate of Canada. If the average of Nova Scotia were given distinct from that of New Brunswick, a more striking contrast, it is very probable, would be revealed. At all events, the opinion that rheumatic affections, like those of the lungs, obey, in some measure, the inflections of the isotheral and isocheimal curves, is warranted.

It will be observed that the annual ratio of rheumatic affections is two and three-fold greater among our troops than among the British, and that the same relation obtains in regard to pulmonary diseases. This may arise in some measure from the mode of reporting. In our service, all cases of disease, more especially of late years, are registered—those in hospital as well as those in quarters, whilst the British statistics, it would seem, contain only cases of admission into hospital. Much, however, is to be ascribed to the nature of the region we inhabit, which lies in the middle latitudes of the eastern side of a continent prolonged towards the poles. It is, therefore, emphatically an *excessive* climate, exhibiting the greatest range of temperature and the most marked distinction of seasons, whilst all the regions of the British commands are either mild insular climates or those in which a low temperature predominates.

Among the various systems of climate presented in the extensive region of the United States, that of the Peninsula of Florida is wholly peculiar. Possessing an insular temperature not less equable and salubrious in winter than that afforded by the south of Europe, it will be seen that invalids requiring a mild winter residence, have gone to foreign lands in search of what might have been found at home. Florida, therefore, merits the attention of physicians at the north; for here the pulmonary invalid may exchange for the inclement season of the north, or the deteriorated atmosphere of a room to which he may be confined, the mild and equable temperature, the soft and balmy breezes, of an ever-green land in which wild flowers never cease to unfold their petals.

From the earliest period, change of climate has been regarded as a remedial agent of great efficacy. This opinion is, indeed, confirmed by daily experience. Diseases that have long resisted medical treatment, are frequently suspended or entirely cured by a removal from a crowded city to an

open country, or are found to yield, under the influence of such a change, to remedies that previously produced no impression.

Although the influence of different climates in the causation as well as the alleviation and cure of diseases, is a fact universally conceded; yet there is, perhaps, nothing in general science more unsatisfactory than the attempts hitherto made to explain the *modus operandi* of this power. This, however, will not be a matter of surprise, when it is recollected that the problem of physical climate remains, in a great measure, unsolved. How much more complicated then must the subject become, when involved with the elements of organic life, and all the complexity of their combinations resulting from health and disease.

Climate, indeed, modifies both the moral and physical nature of man. Each region of the globe presents peculiarities in regard to such organic modifications. The inhabitants of the same continent, as the German from the French, or the Esquimaux from the Southern Indian, may be readily distinguished. In casting one's eye over our National Legislature, the same diversity of physiognomy is apparent. The general countenance of each State's delegation is, indeed, a pretty sure criterion to judge of its comparative salubrity. We can at once distinguish the ruddy inhabitant of that mountain chain, where health and longevity walk hand in hand, where Jefferson and Madison inspired its cheerful and invigorating breezes, from the blanched resident of the sunny south—that fair and inviting land, whose fragrant zephyrs are laden with poison—the dews of whose summer evenings are replete with the seeds of mortality.

As erroneous impressions pervade the public mind in relation to the climate of East Florida as regards its comparative salubrity, it may not be inappropriate, before entering upon a special description, to give some general results based upon numerical calculations. These results, like those already given, are founded upon official papers on file in the War Department, the details of which constitute an official report on the vital statistics of the army, and the medical topography of the military stations.

According to the regimental returns, the ratio of mortality among the troops serving in Florida, from all causes—"ordinary, killed in action, died of wounds, and accidental"—during the years 1836, 1837, 1838, 1839, is 6.1 per cent. The annual average exhibits a progressive decrease, being in 1836, 11.4; in 1837, 6.9; in 1838, 4.7; and in 1839, 4.7 per cent. The ratio of mortality among these troops varies little from that of garrisons stationed in the south in time of peace—a fact established by the results of statistical investigations, and confirmed by the subjoined table, which exhibits, for the period of ten years, the average mortality of the army, computed by regiments:

Years.	1829	1830	1831	1832	1833	1834	1835	1836	1837	1838	Average.
Ratio of deaths per 1000 of mean strength annually.	36	32	29	68	30	57	49	48	53	42	44

The most conclusive evidence upon this point, is here afforded in the fact that although more than one-third of the actual strength of the army served in Florida in 1838, yet the mortality of the whole army for that year is only 4.2 per cent., a ratio lower than the mean of ten years. The ratio of mortality among the regular troops operating against the Seminoles, on an average of four years, is considerably lower than that of the 4th regiment of infantry for the period of the ten years embraced in the table just given. This regiment, which has borne the "tug of war" amid ungenial climes, presents the highest ratio, 7.6 per cent.; whilst the 5th infantry, which has had a kind of *home* station on the northern lakes, exhibits the lowest mortality, 1.3 per cent.

That the mortality among the invalids sent out of Florida will increase the ratio, may be supposed; but it is found, on investigation, that the result is not materially affected. Amongst the invalids that left Florida during the years 1836, 1837, and 1838, no more than 17 deaths can be traced. Including these fatal cases, the annual mortality in Florida from all causes, is increased from 6.1 to 6.3 per cent.

Prior to the pending hostilities, four permanent posts were maintained in East Florida, viz: Forts Marion, King, Brooke, and Key West. The annual mortality at the first three is 28 per 1000, and including Key West, it rises to 40. Although the climate of this region is treated of merely in reference to its fitness as a winter residence, yet it may not be amiss to give a general view of the relative mortality of the troops in the different sections of the United States, based on an average of 10 years.

Divisions.	Systems of Climate.	Aggregate mean strength.	Annual ratio of mortality per 1000 of strength	
			Adj. General's returns.	Medical returns.
North'n.	1st Class. Coast of New England,	4279	20	15
	2d Class. Posts on Northern chain of Lakes,	6377	13	9
	3d Class. Posts north of lat. 39°, and remote from the ocean and inland seas,	12790	14	8
	Average,	23446	15	9
Sou.Mid.	1st Class. Coast from Delaware Bay to Savannah,	6740	34	30
	2d Class. South-western stations,	11739	45	36
	1st Class. Posts on the lower Mississippi,	3810	53	44
	2d Class. Posts in the Peninsula of Florida,	4781	39	26
	Average,	27070	42	34
	Mean of the United States,	50516	30	22

It thus appears that in the northern division, the mortality, according to the Adjutant General's returns, is 1.5 per cent., and, according to the medical returns, 0.9 per cent.; and in the middle and southern divisions, according to the former, the mean is 4.2, and according to the latter, 3.4, per cent. In this calculation, the deaths from epidemic cholera have been excluded from both classes of returns; and from the medical reports, such deaths also as arose from homicide, suicide, asphyxia from cold, submersion, etc. The former exhibits the ratio of mortality from *all* causes, with the exception of Asiatic cholera, as reported in the post returns by the commanding officer; whilst the latter, as it shows the mortality arising from diseases chiefly, may be regarded as a pretty fair expression of climatic influence. In the middle and southern divisions, the ratio of mortality, according to the medical returns, is nearly four-fold greater than in the northern, and according to the post returns nearly three times higher. Our northern latitudes exhibit little variation in the annual mortality; but the southern, in consequence of more fatal epidemic visitations, show great extremes. It must be borne in mind that in the latter the troops consist mostly of northern constitutions impaired by intemperate habits. In the above abstract, the aggregate of deaths is 1104, more than one half of which may be traced to the effects of inebriation—a vice which, according to these statistics, may be indulged in our northern States as contrasted with the southern, with comparative impunity.

With the exception of the northern division, the mortality from disease is lower in east Florida than in any other class of posts. Forts Marion, King and Brooke, which have been kept up for many years, have always been esteemed healthy posts. Fevers of the intermittent and remittent type are the prevailing diseases. Excepting the southwestern region, the ratio of intermittents is higher in this class than in any other; but if the comparison is limited, for example, to Fort M'Henry, (Baltimore,) Fort Severn, (Annapolis,) and Fort Washington, opposite Mount Vernon, it is found favourable to the former, notwithstanding the garisons of these northern posts generally formed summer encampments. As regards remittents in east Florida, the annual ratio of cases, which is 102 per 1000 of the strength, is lower than the three preceding classes in the table, whose respective averages are 181, 180, and 196. In the first class of the middle as well as of the southern division, febrile action often assumes the high grade of intensity designated *yellow fever*. Whilst the causes of this fatal endemic seem to be annually present at Charleston and New Orleans, it has made its appearance but twice at St. Augustine within the period of 20 years.

Fevers of malarial origin are both more prevalent and fatal in that portion of Florida which borders on Georgia. Along the coast, and in many parts of the interior, salubrious positions are often found. At several posts along the eastern coast, a case of fever has sometimes not been reported in three or six months. Other localities, the stations being often selected less with

reference to salubrity than military advantage, are not unfrequently very unhealthy.

In treating of the climate of Florida, the primary object held in view is, to direct attention to its fitness as a *winter* residence for northern invalids. In 1833, Professor Dunglison called the attention of the profession, on the strength of the meteorological registers kept by the medical staff of the army, to the suitableness of St. Augustine and Tampa Bay as a winter retreat. An examination of abstract No. 2, of Appendix, showing—1. The mean temperature of each month, each season, and the whole year; 2. The difference between the mean temperature of each month and season; and 3. The annual and monthly ranges of temperature—will, it is believed, not only furnish further confirmation of the doctrines already conclusively established, but lead to results of great value to the practical physician.

The results of the four posts in abstract No. 2 of Appendix, illustrate the modifying agency of large bodies of water. Fort King, situated in the interior, has a warmer summer and a colder winter than the remaining stations, all of which are on the coast. Although Key West is 4°39′ south of Fort King, and has a mean annual temperature 3°.43 higher, yet the mean summer temperature is 2°.81 lower. The equalizing influence of the ocean is still further shown by the annual range of the thermometer, the mean of the monthly ranges, and the mean difference of successive seasons. During the summer months, the morning and evening observations are nearly the same at both points, the disparity being caused by the exalted temperature of Fort King at mid-day. In each year, July was the hottest month at Key West, and the month of June at Fort King. As is usual in southern latitudes, there is little variation presented at Key West in the mean temperature of the same month in different years.

There is little difference between the thermometrical phenomena presented at Key West and the Havanna. Within the period of six years, (from 1830 to 1835 inclusive,) the mercury at Key West was never known to rise higher than 90°, nor sink lower than 44°.

The peculiar character of the climate of Florida, as distinguished from that of more northern latitudes, consists less in the mean annual temperature than in the manner of its distribution throughout the year. At Fort Snelling; Iowa, the mean temperature of winter is 17°.29, and of summer, 72°.80, whilst at Fort Brooke, Tampa Bay, the former is 65°.02, and the latter 81°.04 and at Key West, 70°.05 and 81°.39. Notwithstanding the winter at Fort Snelling is 52°.76 colder than at Key West, the summer, at the latter is only 8°.59 warmer. In like manner, although the mean annual temperature of Petite Coquille, La., is nearly 2° lower—that of Augusta Arsenal, Ga., nearly 8°—and that of Fort Gibson, Arkansas, upwards of 10° lower, than that of Fort Brooke; yet at all, the mean summer temperature is higher. Between Fort Snelling on the one hand, and Fort Brooke and Key West on the other, the relative distribution of temperature stands

thus:—Difference of the mean temperature of summer and winter at the former 55°.51, and at the two latter 16°.02 and 11°.34; difference of the mean temperature of the warmest and coldest month, 61°.18 compared with 17°.68 and 14°.66; and the mean difference of successive months stands as 10°.20 to 2°.97 and 2°.44. At Fort Snelling, the annual range of the thermometer is 116°, and at Fort Brooke and Key West it is 56° and 37°; and the mean of the monthly ranges bears the relation of 50° to 29° and 16°. The attention is thus directed merely to a few prominent points, as a reference to the tabular abstract will enable any one to trace much farther this remarkable equality in the distribution of temperature among the seasons in Florida. A comparison with the most favoured situations on the continent of Europe, and the islands held in highest estimation for mildness and equability of climate, affords results no way disparaging. A comparison of the mean temperature of winter and summer, that of the warmest and coldest months, and that of successive months and seasons, furnishes results generally in favour of the peninsula of Florida. The mean difference of successive months stands thus:—Pisa 5°.75, Naples 5°.08, Nice 4°.74, Rome 4°.39, Fort King 4°.28, Fort Marion, at St. Augustine, 3°.55, Penzanee, England, 3°.05, Fort Brooke 2°.97, Key West 2°.44, Madeira 2°.41. The mean annual range thus;—Fort King 78°, Naples 64°, Rome 62°, Nice 60°, Montpellier 59°, St. Augustine 59°, Fort Brooke 56°, Penzanee 49°, Key West 37°, and Maderia 23°.* The island of Madeira is esteemed by Dr. Clark as best adapted to consumptive patients.

In the West India islands, the mean annual temperature near the sea is only about 80°. At Barbadoes, the mean temperature of the season is—winter 76°, spring 79°, summer 81°, and autumn 80°. The temperature is remarkably uniform; for the mean annual range of the thermometer, even in the most variable of the islands, is only 13°, and in some it is not more than 4°.† Contrast this with Fort Snelling, Iowa, which gives a range of 116°!

It has been seen that the meteorologieal agents which determine the ratio of pulmonie lesions, eausing the first and fourth quarters to present the highest averages, and the third the lowest, is the marked distinction of season characterized by extremes of temperature. Hence the apparent exception to this rule in the system of climate pertaining to East Florida, where the third quarter has a higher ratio than the second or fourth, (see Table p. 21,) instead of contradicting a general law, corroborates it. As Florida is an ever-green land, the influence of the seasons does not impress the pulmonary organs sufficiently to derange their functions by their transition. Hence the ratio of pulmonic lesions is low; and as the causes which are secondary in excessive climates, grow here into primary ones, these diseases may be as rife in the summer as in the spring or autumn.

* Contrary to the numerical ratios furnished in his tables, Dr. Clark says that "the mean annual range of temperature is only 14°"—an error which has crept into the writings of Dr. Dunglison.

† According to the British army statistics.

The state of the weather as indicated by the course of the winds and the proportion of fair and cloudy days, calculated for the same years as abstract No. 2 of Appendix, is shown in the following table:—

Places of Observation.	Course of Winds.								Prevailing	Weather.			Prevailing
	N.	N.W.	N. E.	E.	S. E.	S.	S. W	W.		Fair.	Cloudy.	Rain.	
	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.		Days.	Days.	Days.	
St. Augustine,	1.55	2.86	9.08	1.03	10.83	1.11	2 61	1.33	S. E.	19.02	5.19	6.22	Fair.
Fort King,	1.62	2.79	3.46	3.54	4.37	5.63	5.96	3.08	S.W.	25.75	2.88	1.89	Fair.
Fort Brooke,	1.53	3.72	5.58	2.89	4.44	2.75	6.42	3.17	S.W.	20.33	4.47	5.61	Fair.
Key West,	3.20	3.13	10.50	5.37	5 37	0.51	1.67	0.38	N.E.	21.54	3-08	5.92	Fair.

The want of hygrometrical observations to indicate the actual or comparative humidity of the atmosphere is to be regretted. That the air is much more humid than in our more northern regions is sufficiently cognizable to the senses. The dews, even in the winter, are generally very heavy. To guard against the oxidation of metals, as for example surgical instruments, is a matter of extreme difficulty. During the summer, books become covered with mould, and keys rust in one's pocket. *Fungi* flourish luxuriantly. The writer has known a substance of this kind spring up in one night, and so incorporate itself with the tissue of a woollen garment as to render separation impracticable. As general relaxation and lassitude are consequent on this prevailing humidity, it may exercise some agency in the production of the comparatively high ratio of pulmonic and rheumatic affections in the summer season. One of the best safeguards against its effects is, to wear flannel next the skin—a custom generally adopted in the army. It is, indeed, a hygienic measure no less valuable in warm than in cold climates, affording comparative immunity against thermometrical and hygrometrical vicissitudes.

As the rains, however, generally fall at a particular season, so the atmosphere in winter is comparatively dry and serene. The following abstract of the monthly fall of rain at Key West, is the mean result of five years' observation:—

Jan.	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sep.*	*Oct.*	*Nov.*	*Dec.*	*Annual average.*
1.82	1.34	1.98	1.09	6.31	2.39	2.84	3.30	4.35	3.33	1.49	1.13	31.40

It will be observed that during six months, from November to May, which is the longest period that a northern invalid should remain in this climate, the proportion of rain is but 8.81 inches. It has been already remarked that in tropical climates a portion of the year is known as the rainy season, and that the same quantity descends in a much shorter space of time than in the temperate zone; and that consequently the proportion of fair days and clear skies is infinitely in favour of the former. In the table

of the weather just given, in which the ratios are monthly averages, this result is strikingly manifested. At Fort King, the annual number of fair days is 309, whilst on the northern lakes, it is only 119. On the coast of Florida, however, the average is not more than 250 days.

The influence of temperature on the living body is often indicated more accurately by our sensations than the thermometer. The advantages of climate as regards its fitness for the pulmonic, not unfrequently depend on the mere circumstance of exposure to, or shelter from cold winds. The frequency and severity of the winds at St. Augustine constitute a considerable drawback on the benefits of the climate. The chilly northeast blast, surcharged with fogs and saline vapours, sweeping around every angle of its ancient and dilapidated walls, often forbids the valetudinarian venturing from his domicil. To obviate these disadvantages, a large house was erected at Picolata on the St. John's; but during the pending Indian disturbances, it has been converted into a barrack and an hospital.

To persons labouring under an irritable state of the bronchial membrane, high winds are particularly injurious. If the consumptive invalid have much sensibility to harsh and keen winds, and if the immediate vicinity of the sea be known to disagree, Fort King ought to be recommended before St. Augustine or even Fort Brooke; but as sea-air is known to be generally adapted to a relaxed habit and a languid and oppressed circulation, a favourable position on the coast should, in such cases, be selected as a winter residence.

The natural advantages of position, without reference to extrinsic circumstances are now under discussion. St. Augustine is on the eastern coast; Fort Brooke is at the head of Tampa Bay,* about 30 miles from the Gulf of Mexico; Fort King is intermediate to these two points; and Key West belongs to the Archipelago south of Cape Sable. The pending hostilities with the Aborigines, and the difficulty of obtaining accommodations indispensable to the comfort of the invalid, render a winter retreat almost impracticable any where but at St. Augustine or Key West. The oldest town in the United States, and built mostly of a concrete shelly stone in the Spanish style, St. Augustine presents an antiquated appearance, enlivened by beautiful orange-groves bending at due season beneath their golden fruit.† The old Spanish fort and the *tout ensemble* of the city, give it more the resemblance of a place of defence than of elegance; but it is these circumstances which associate it with history, and render it peculiarly interesting to the American traveller. Moreover, the inhabitants extend kindness and hospitality towards strangers. Key West, about 60 miles southwest of Cape Sable, is two

* The old Spanish appellation was Espiritu Santo, or bay of the Holy Ghost, the name Tampa being then restricted to an arm.

† In 1835, nearly all the orange trees in Florida were destroyed by frost—an occurrence previously unknown in the memory of the oldest inhabitant.

miles wide and ten long, and is remarkable as being the most southern settlement of the United States. Possessing a good harbour, it has been from time to time the station of our West India squadron. It contains about 1400 souls, and is a place of some commerce chiefly in the way of wrecked goods.

In contemplating the scenery of East Florida in the month of January, one is apt to forget that it is a winter landscape. Fort Brooke on Tampa Bay is a truly delightful spot, in which tropical fruits flourish luxuriantly. The lime, the orange, and the fig find there a genial soil, whilst the moss-covered* live-oak and the Pride of China, add beauty and variety to the scene. Vegetation is continuous through every season, culinary vegetables growing in January; and the temperature of the waters in rivers and bays will admit of bathing in every month of winter. To the northern man, all nature seems changed. Even the birds of the air—the pelican and flamingo —indicate to him a climate entirely new. Having accompanied a boat expedition, the object of which was to explore the sources of the St. Johns, the writer found, in the month of January, the high cane-grass which covers its banks intertwined with every variety of morning-glory, (*convolvulus.*) The thermometer at mid-day, in the shade, stood at 84° Fahr, and in the sun, rose to 100°; and at night we pitched no tents, but lay beneath the canopy of heaven with a screen perhaps over the face as a protection against the heavy dews. Notwithstanding the day attains such a high temperature, the mercury just before day-light often sinks to 45°, causing a very uncomfortable sensation of cold.

But there are other localities which combine advantages equally important to the pulmonary invalid. On the eastern coast of Florida, at New Smyrna for example, the warmth and softness of the air wafted from the isles of the West Indies across the gulf-stream, in the winter months, are truly grateful to the senses lulling them into repose. Even the virtuoso would not be without materials for contemplation; for here may be seen the ruins of Dr. Turnbull's colony of Greeks, Italians, and Minorcans—his unfinished castle, whose dilapidated and mouldering walls are covered with ivy, amid the luxuriance of the palm,† orange, mangrove, and magnolia. Cape Sable and the coast extending northward towards Key Biscayno, as well as the adjacent islands, would also afford an excellent winter retreat. Adapted to the

* This parasite, (*Tilandsia usneoides,*) known by the vulgar name of Spanish moss, casts a sombre aspect over the scenery of Florida. Resembling the weeping willow clothed in the garniture of hoary age, it has been styled, not inappropriately, the shades of death.

† The cabbage-palm, (*chæmarops palmetto,*) is a beautiful tree, presenting sometimes a straight column of 80 feet without a limb. The trunk is generally enclosed by the foot-stalks of the old branches, resembling a coarse net-work. The embryo head is esculent bearing the taste of unripe chesnuts. The leaf is used in the manufacture of hats, mats and baskets, as well as in the construction of the Indian's wigwam.

cultivation of tropicoid fruits, and abounding in game, fish, and turtle, this region, from the prevalence of the sea-breeze or trade-winds, presents a climate delightful even in the summer season. Key Biscayno, which is situated on the southeastern coast of Florida, affords an excellent harbour of safety and protection from the storms which frequently rage along the coast. This island is thus described by a medical officer of the army, when stationed there six months:—

"In the midst of summer, the constant prevalence of the sea-breezes renders it at all times of the day delightful in the shade. During the winter, frost is never known; nor is it ever so cold as to require the use of fire. The eastern beach commands a beautiful view of the open sea, and offers, especially during low tide, an admirable place for exercise on horseback for the distance of four or five miles, and for morning and evening walks. The waters around abound in green turtle, and a variety of excellent fish, forming a wholesome and nutritious diet, particularly well suited to cases of pulmonary disease. There is also an abundance of crawfish and crabs. The mainland is only a short distance off, abounding with deer and a variety of other kinds of game, affording a fine field for the sport and exercise of hunting; and the vicinity of the West India islands will, at all times, present the opportunity of procuring the best of the tropical fruits.

"The proprietor of the island will, in a short time, erect buildings, and will establish every means in his power for the convenience and comfort of those who may be disposed to visit the place for the recovery of their health. There has been not a single case of fever among the troops since I have been stationed here, and I have no hesitation in stating my opinion that it will be perfectly healthy at all seasons of the year."

When not exposed to the influence of malaria, the climate of Florida, as along the eastern coast, is, even in the season of summer, quite salubrious. The sea-breezes, aided by the deposition of moisture from the atmosphere, generally render the nights pleasant, even in the hottest months and in the centre of the Peninsula. The writer can state from personal knowledge that after the middle of August the nights become so cool that a blanket is desirable. The climate of the tropics is characterized, as Humboldt justly remarks, much more by the duration of heat than its intensity; and it is to the action of this unceasing high temperature that much of the injurious influence of tropical climes on northern constitutions, is to be ascribed.

But woe to the invalid that braves the torments of a summer residence under the disadvantages of a camp life! Insects are the pest of a tropical clime. As to fleas, flies, and ticks, the interior of Florida may well rival Egypt in the days of Pharaoh. The chigoes insinuate themselves beneath the skin, where they soon establish populous colonies. Flies seem, indeed, to form a component part of your food, your drink, and the atmosphere you inhale. Lizards, snakes, and scorpions, get into your bed, whilst the industrious ant and weevil not only eat your rations, but devour your books—the food

of the mind. All nature seems alive; and every hour you observe some uncouth living thing, whose family name has scarce been registered by the entomologist. In addition to these annoyances, you will have a nightly serenade performed by wolves and alligators—a woful concert of whining yells and dismal bellowings, constituting the realization of a *howling* wilderness.

Since a more rational view of the nature and causes of pulmonary diseases has prevailed, the beneficial effects of change of climate in certain forms have been fully established. Formerly, when consumptive patients were indiscriminately condemned to undergo expatriation, the unfortunate invalid often sank before he reached his destination, or he was doomed soon to add another name to the long and melancholy list of his countrymen, who seem to have sought a foreign land, far from friends and home, only to find a premature grave. When it is considered, however, that all remedial agents have proved so ineffieacious in phthisis pulmonalis as to place it emphatically among the *opprobria medicorum*, it is no ways surprising that its victims should seek beneath the influence of a more genial clime, the relief, however uncertain, denied them in their own.

The south-western coast of a country is generally mild and humid, and consequently soothing but rather relaxing. In diseases accompanied with an inflammatory condition of the general system, or dependent on an excited state of particular organs, this variety of climate has been found more especially beneficial. Decided advantage may reasonably be anticipated in chronic inflammatory affections of the trachea and bronchia, attended with a dry cough and little expectoration; but when such cases occur in individuals of a languid and relaxed state of constitution, accompanied by copious expectoration from the mucous surfaces, the disease is much more likely to be aggravated than relieved. These remarks, which are made by Clark "on Climate," are equally applicable to all other diseases attended with great relaxation of the general system. It is, therefore, manifest that, in recommending a change of residence to invalids, attention to these distinctions, both in regard to varieties of climate and peculiarities of disease, is absolutely necessary.

The climate of Florida has been found beneficial in incipient cases of pulmonary consumption, and those threatened with the disease from hereditary or acquired predisposition. It is in chronic bronchial affections more particularly that it speedily manifests its salutary tendency. To distinguish the *bronchial* from the *tubercular* form of the disease, often demands considerable powers of discrimination; and upon this distinction frequently hangs the propriety of a removal to a southern clime. The application of the physical means of exploration, now so ardently cultivated, has fortunately given a greater degree of certainty to our diagnosis.

But there are other forms of disease in which such a climate as that of East Florida is not unfrequently of decided advantage. To this class

belongs *asthma.* As this term is too commonly applied to every disease in which difficulty of respiration is a prominent symptom, let us not prescribe for a mere name; but when consulted on the propriety of a change of climate, let the pathological condition of the patient be duly estimated. In simple spasmodic asthma, unconnected with organic disease, or in that form which is complicated with chronic bronchitis, or is symptomatic of primary irritation in other viscera, such as the stomach, intestines or uterus, the patient is generally much benefited. In asthma connected with affections of the heart, a mild climate often affords temporary relief. In this variety of complication, a sea-voyage is frequently of striking service.

In chronic disorders of the *digestive* organs, when no inflammation exists or structural changes have supervened in viscera important to life, but the indication is merely to remove disease of a functional character, a winter residence promises great benefit; but exercise in the open air, aided by a proper regimen, are indispensable adjuvants.

In many of those obscure affections, called *nervous*, unconnected with inflammation, exercise and travelling, in this climate, are frequently powerful and efficient remedies.

Chronic rheumatism, though apparently much less under the influence of meteorological causes than pulmonic affections, will often be benefitted by a winter residence in Florida. As these cases often resist the best directed efforts of medicine, it is the only remedy which the northern physician can recommend with a reasonable prospect of success. When the disease is complicated with much derangement of the digestive organs, it is customary in Europe to visit such places as combine the additional advantage of a course of bathing, as the mineral waters of the Pyrenees, those of Aix in Savoy, and the various baths of Italy.

When there exists a general delicacy of the constitution in childhood, often the sequel of rubeola or scarlatina, manifesting itself by symptoms indicative of a scrofulous disposition, a winter residence in a warm climate frequently produces the most salutary effects. At the period of puberty in females, a similar condition of the system often arises, preventing the development of those new functions peculiar to this stage of life. This general derangement, if not soon corrected, often results in a constitutional disorder beyond the resources of our art, denominated by Clark "*Tubercular Cachexy*," the precursor of pulmonary consumption. If the winter can be passed in a warm climate, and the patient have the advantage of exercise on horseback, warm sea-bathing, and a well regulated diet, the youthful invalid may often be rescued from an untimely grave.

Another form of disease remains to be alluded to, in which change of climate promises its healing powers, *viz.*, premature decay of the constitution, characterized by general evidence of deteriorated health, whilst some tissue or organ important to life commonly manifests symptoms of abnormal action. This remarkable change often occurs without any obvious cause,

and is not inappropriately termed in common parlance, "a breaking up of the constitution."

Let not the invalid, however, trust too much to a change of climate. Unfortunately for the character of the remedy, it has been recommended indiscriminately and without proper consideration. It has been too often resorted to as a last resource or forlorn hope; or in cases susceptible of alleviation or permanent cure, it has been wholly misapplied. One person is hurried from his native land with the certainty of having his sufferings increased and his life shortened, instead of being allowed to die in peace in his own family; whilst another, who might derive much advantage from the change, is sent abroad wholly uninstructed in regard to the selection of a proper residence, or ignorant of the various circumstances by which alone the most suitable climate can be rendered beneficial. It is one of our most powerful remedial agents, and one too which, in many cases, will admit no substitute. But much permanent advantage will result neither from travelling nor change of climate, nor their combined influence, unless the invalid adheres strictly to such regimen as his case may require. This remedy must be considered in the light of all other therapeutic means, and to ensure its proper action, it is necessary that the requisite conditions be observed.

At the present time, St. Augustine and Key West are the only places, which afford the conveniences required by the wants of an invalid; but assuming that proper accommodations can be equally obtained at all points, Key Biscayne on the southeastern coast, or Tampa Bay on the Gulf of Mexico, claims a decided preference, especially over St. Augustine. As a general rule, it would be judicious for the northern physician to direct his pulmonary patient to embark about the middle of October for Tampa Bay. Braving the perils of the wide ocean, he will realize the healthful excitement incident to the fears and hopes of a sea-voyage. Having spent the winter months at Tampa, let him proceed early in March to St. Augustine, by way of Dade's battle-ground and the old Seminole agency. In addition to the corporal exercise, he will find food for mental digestion at every step of his journey. Having thus reaped the benefit of a sea-voyage and all the advantages to be derived from a change of climate, the valetudinarian may return to his anxious friends so much renovated in health and spirits as to be capable of enjoying again the blessings of social life.

As long, however, as predatory Seminole bands retain possession of this peninsula, few itinerant invalids will imitate the example of the celebrated Spanish adventurer, Ponce de Leon, who, in the wild spirit of the 16th century, braved the perils of unknown seas and the dangers of Florida's wilds, in search of the far-famed fountain of rejuvenescence. When the period, however, of the red man's departure shall have passed, the climate of this "land of flowers" will, it may be safely predicted, acquire a celebrity as a winter residence not inferior to that of Italy, Madeira, or Southern France.

Fort Wood, *Harbour of New York, September*, 1840.

Abstract No. 1 of Appendix, showing the relative influence of the seasons in regard to Pulmonic and Rheumatic Diseases, based on 10 years' observations and an aggregate mean strength of 47,220—the strength being computed from the Monthly Returns in the Adjutant General's Office.

MILITARY STATIONS.	First Quarter.							Second Quarter.							Third Quarter.							Fourth Quarter							Annual Results.							Deaths.					
	No. of Years of observation.	Aggregate mean strength.	Catarrh and Influenza.	Pneumonia.	Pleuritis.	Phthisis Pulmonalis.	Rheumatic affections.	No. of Years of observation.	Aggregate mean strength.	Catarrh and Influenza.	Pneumonia.	Pleuritis.	Phthisis Pulmonalis.	Rheumatic affections.	No. of Years of observation.	Aggregate mean strength.	Catarrh and Influenza.	Pneumonia.	Pleuritis.	Phthisis Pulmonalis.	Rheumatic affections.	No. of Years of observation.	Aggregate mean strength.	Catarrh and Influenza.	Pneumonia.	Pleuritis.	Phthisis Pulmonalis.	Rheumatic affections.	Aggregate mean strength.	Catarrh and Influenza.	Pneumonia.	Pleuritis.	Phthisis Pulmonalis.	Rheumatic affections.	Catarrh and Influenza.	Pneumonia.	Pleuritis.	Phthisis Pulmonalis.	Hæm. physis.	Rheumatic
1st Class—Northern Division.																																									
Fort Sullivan,	8	484	30	7	6	2	12	8	455	23	1	7		18	7	339	11	2	5		14	7	399	38	14	9	1	20	432	102	24	27	3	64				2		
" Preble,	7	382	17	3	8		11	6	336	6	3	5	2	8	7	382	5	2	1	2	12	7	394	21	4	4	3	12	376	49	12	18	7	43				2		
" Constitution,	8	443	3	3		1	4	7	371	1		4		6	7	365		3			5	7	382	26	1		1	3	300	30	7	4	2	18			1			
" Independence,	5	564	14	85	10	1	23	5	574	5	22	19	3	27	5	570	8	31	7	3	36	4	426	6	84	3	1	25	533	33	222	39	8	113			1	2		
" Wolcott,	8	420	40	4			9	7	349	11	1	5		7	7	362	4	2		1	6	7	382	38	10			7	360	93	17	5	1	29				2		
" Trumbull,	8	635	36	2	6	1	15	7	516	15	1	3	2	11	7	677	21	2	3	3	9	7	588	23	1	4	2	11	604	95	6	16	8	46				4		
" Columbus,	8	1081	92	2		2	20	7	998	93		4	5	24	8	907	69		4		23	9	806	104		4	2	23	948	358	2	12	9	90				4		
Total, *excluding Ft. Independence,*		4018	218	21	20	6	96		3539	149	6	28	9	101		3662	110	11	13	6	105		3377	250	30	21	9	101	3663	727	68	82	30	403		1		15		
Ratio per 1000,			63	6	6	2	24			49	2	9	3	28			36	3	4	2	29			85	10	7	3	30		233	22	26	9	110						
2d Class.																																									
Fort Brady,	10	1011	74	3	1	3	23	10	947	56	4	4	1	31	9	885	46	16			20	10	1004	72	10	2	3	17	962	248	33	7	7	91				1		
" Mackinac,	9	948	66	1	5	1	47	8	838	47	2	12		60	8	800	50	5	10		34	8	872	40	3	12	2	41	865	203	11	39	3	182						
" Gratiot,	9	882	119	4	9		51	9	699	79	12	10	2	22	7	688	24		6	1	25	9	857	124	5	7	1	35	782	340	21	32	4	133				1		
" Howard,	10	1764	129	1	11	10	89	10	1702	70	2	16	6	61	9	1526	94		25	10	50	10	1594	91	3	8	2	65	1647	384	6	60	28	274	1	1		1		
" Dearborn,	7	668	30	1	6	1	20	6	542	8	1	5		8	6	579	6		4		17	6	561	18	1	5	1	11	588	62	3	20	2	56				1		
" Niagara,	7	677	55	10	5	2	15	6	561	54	5	3	3	14	5	498	30	1			23	6	544	64	3	4	1	20	570	203	19	12	6	72		1		5		
Madison Barracks,	4	420	102	4	6		19	4	378	38	6	3		14	4	672	32	5			26	4	773	183	3	2		48	561	355	18	11		107		2				
Total,		6370	575	24	43	17	294		5667	352	32	53	12	210		5648	282	27	45	11	204		6205	592	28	40	10	237	5975	1801	111	181	50	915	1	4		9		
Ratio per 1000,			90	4	7	3	41			62	6	9	2	37			50	5	8	2	36			96	5	7	2	38		301	19	30	8	151						
3d Class.																																									
Hancock Barracks.	10	1671	168	19	27	3	47	10	1560	83	6	35	1	86	10	1630	62	11	9		56	10	1672	124	5	1	5	59	1633	437	41	85	9	248		1		4	1	
West Point,	10	3631	783	15	20	6	177	10	3543	559	4	3		187	10	3898	555	20		1	198	10	3865	1176	37	11		126	3734	3073	76	34	7	688				4		
Fort Snelling,	10	1547	210	3	16	4	108	10	1515	314	2	6		127	10	1424	182	3	13		73	10	1499	214	1	17		84	1490	920	9	52	4	392				1		
" Winnebago,	10	1535	162	5	6	1	33	10	1505	74	4	16	2	35	10	1527	80	1	2	6	15	10	1571	132	1	5	1	26	1534	448	11	21	10	101			1	3		
" Crawford,	9	1060	288	6	19	3	42	10	1749	255	6	9	2	62	10	1885	146	2	17	5	58	10	1878	356	14	30	3	47	1793	1048	28	75	13	209				6		
" Armstrong,	8	666	96	3	6		33	7	534	46	3	7	1	33	6	555	19		3	1	24	7	608	48	3	7	1	23	591	209	9	23	3	113						
" Leavenworth,	10	2127	537	15	23	11	134	8	1492	92	13	14	4	76	8	1546	33	7	4		37	9	2126	180	9	10	4	88	1823	842	37	57	19	335		2		4		
Total,		12837	2244	66	117	28	574		11838	1423	36	90	10	606		12465	1077	44	48	13	461		13219	2233	63	98	14	453	12804	977	211	355	65	2084		3	1	22	1	
Ratio per 1000,			175	5	9	2	45			120	3	8	1	48			86	4	4	1	37			169	5	7	1	34		552	17	28	5	166						

1st Class—Middle Division.																																								
Fort Delaware,	4	399	27	1	4	2	7	4	372	11		1	4	6	3	302	1				9	3	329	16	1	1	5	3	350	55	2	6	11	25		1		2		
" McHenry,	7	652	79	10	12		13	7	598	45	1	4		15	7	567	7		2	1	14	7	569	80		12	2	10	596	211	11	30	3	52				1		
" Severn,	6	360	39	6	7	3	15	7	409	17	2	1	3	13	7	412	6	4	5	2	11	6	357	40	6	4		10	385	102	18	17	8	49				2		
" Washington,	5	290	43	3	3	1	5	6	340	28	1	4	1	7	6	318	3		2		1	7	397	42	3	7	2	5	336	116	7	16	4	18				4		
" Monroe,	9	2625	591	132	81	8	133	9	2784	407	53	31	6	134	9	3196	299	10	20	3	99	7	1998	677	54	35	4	73	2651	1974	249	167	21	439	4	8		17		
Bellona Arsenal,	5	264	14	4	2		12	5	265	2	1			6	5	259	1				1	4	208	29	1				249	46	6	2		19						
Fort Moultrie,	7	756	98	6	7	4	28	7	718	33	6	11	4	21	7	611	47	10	1	1	26	6	574	55	8	1	1	8	665	233	30	20	10	83				7		
" Johnston,	7	395	42	1	1	1	4	7	389	5		1	3	13	6	326	5			1	6	5	289	15				2	350	67	1	2	5	25				1		
Oglethorpe Barracks,	6	393	25	2	4	2	12	6	308	11	1	3	1	10	4	220		1			2	4	150	4	1	2		4	268	38	5	9	3	28			1	2		
Total,		6134	958	165	121	21	229		6183	559	65	56	22	225		6211	369	25	30	8	169		4871	958	74	62	14	115	5850	2842	329	269	65	738	4	9	1	3		
Ratio per 1000,			156	27	20	3	37			90	11	9	4	36			60	4	5	1	27			197	15	13	3	24		486	56	46	11	126						
Ratio, *excluding Ft. Monroe.*			102	9	11	4	27			45	4	8	5	27			23	5	3	2	23			97	7	9	3	15		275	25	32	13	93		1	1	19		
2d Class.																																								
Jefferson Barracks,	7	2042	296	41	86	7	62	8	2907	116	8	33	10	61	9	3824	117	12	38	20	25	8	3008	384	25	54	12	81	3193	913	86	211	49	229		8	1	18	1	1
Fort Gibson,	10	3178	506	182	102	12	139	10	3824	251	33	39	7	96	10	4047	73	16	19	16	78	10	4407	276	28	38	7	85	4064	1106	259	198	42	398		12	1	26	1	
Forts Smith and Coffee,	5	253	29		2	1	14	4	207	2	2	1		7	5	270	25	2			6	4	205	13	2	1		7	234	70	6	4		34		2				
Fort Towson,	8	1157	40	22	7	3	45	8	1437	30	7	12	6	44	8	1415	38	1	7	2	29	8	1388	42	17	10	2	47	1349	150	47	36	13	115		1		5		
" Jesup,	10	2281	426	15	28	5	122	10	2299	250	7	45	6	126	10	2291	139	4	20	6	93	10	2330	179	6	50	2	86	2300	994	32	143	19	427		8		12		
Total,		10611	1297	260	225	28	382		10674	649	57	130	29	334		11847	392	35	84	44	231		11428	894	78	153	23	306	11140	3233	430	592	123	1253		31	2	61	2	1
* Ratio per 1000,			122	25	21	3	36			61	5	12	3	31			33	3	7	4	20			78	7	13	2	27		290	39	52	11	112						
1st Class—Southern Division.																																								
Augusta Arsenal,	8	603	61	7	1	2	20	7	493	10	7	1	2	13	7	488	8	4			15	7	359	7	3			12	487	86	22	2	4	60				4		
Fort Mitchell,	6	799	64	2	19	1	27	8	725	14	1			12	8	581				1	9	6	516	12	2	1	1	12	655	90	5	20	3	60				3		
Baton Rouge,	7	1119	77	17	8	2	28	7	1123	41	2	4	5	7	7	943	36		11	2	22	7	1027	66	5	10	2	24	1053	220	24	33	11	81		1	1	1		
New Orleans,	4	283	49		2			5	395	22	3	1	1	1	3	223	5		6	1	2	5	346	38		2		5	312	114	3	11	2	8				1		
Fort Pike,	8	464	30	3	8	3	15	7	395	6	3	4	2	7	6	323	6				11	6	323	17	5	1	2	1	376	59	11	13	7	34				1		
" Wood,	7	380	68	2	2		10	7	328	26		3		11	7	307	22	1	1	1	4	7	320	40				10	334	156	3	6	1	35			1			
" Jackson,	4	218	6	2	4	2	10	2	132	2	1	3		6	2	109					4	4	196	6	2	4		8	164	14	5	11	2	28		1				
Total,		3872	355	33	44	10	110		3591	121	17	16	10	57		2974	77	5	18	5	67		3087	186	17	18	5	72	3381	739	73	96	30	306		2	2	10		
Ratio per 1000.			92	9	11	3	28			34	5	4	3	16			26	2	6	2	22			60	5	6	2	23		218	22	28	9	90						
2d Class.																																								
Fort Marion,	6	305	31	8	3	2	12	6	321	23	3	2	4	12	7	379	17	1	3	3	20	4	206	15	2			5	303	86	14	8	9	49						
" King,	4	345	15	3	1	1	9	4	413	20	4	1		10	3	445	3	1	1	1	7	4	427	9		1	2	9	408	47	8	4	4	35				1		
" Brooke,	5	746	56	1	13		17	4	453	25	1	3		14	4	578	42	2	10		5	4	608	30	5	2	1	12	596	153	9	28	1	48						
Key West,	5	271	13	1	2	1	21	4	231	5	2	2		12	3	106	11		6	1	21	3	164	12		1	1	22	208	41	3	11	3	76				2		
Aggregate of 31 Posts,	1	3467	114	13	33	7	137	1	3280	41	9	15	7	60	1	2606	94	7	3	4	74	1	3016	82	5	11	5	69	3092	331	34	62	23	340			1	6		
Total,		5134	229	26	52	11	196		4698	114	19	23	11	108		4174	167	11	23	9	127		4421	148	12	15	9	117	4607	658	68	113	40	548			1	9		
Ratio per 1000.			45	5	10	2	38			24	4	5	2	23			40	3	5	2	30			33	3	3	2	26		143	15	24	9	119						

Abstract No. 2 of Appendix; showing, I. *The Mean Temperature for each Month, each Season, and the whole Year.*

Places of Observation.	Years of Observation	Mean Annual Temp.	Mean Temp. of the Seasons.				Mean Temperature of Each Month.											
			Winter.	Spring.	Summer	Autumn.	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Lat. 29° 50′, Long. 81° 27′.																		
St. Augustine, - -	1825–8–30	72.24	62.83	70.55	82.05	73.56	62.15	64.97	66.53	68.68	76.44	81.12	82.36	82.68	79.56	73.61	67.47	61.38
Lat. 29° 12, Long. 82° 12′.																		
Fort King, - - -	1833–4	72.66	61.78	72.56	84.20	72.08	60.81	65.28	65.56	73.31	78.81	84.94	84.03	83.63	81.52	72.81	61.98	59.25
Lat. 27° 57′, Long. 82° 35′.																		
Fort Brooke, Tampa Bay,	1825–8–30	73.19	65.02	71.71	81.04	74.59	63.75	66.56	66.48	71.27	77.39	80.90	81.43	80.79	79.01	75.04	69.71	64.76
Lat. 24° 33′, Long. 81° 52′.																		
Key West, - - -	1831–2	76.09	70.05	76.04	81.39	76.96	67.93	72.15	73.71	75.69	79.22	80.51	82.59	81.06	80.89	76.76	73.23	70.08

II. *The Difference between the Mean Temperature of each Month and Season.*

Places of Observation.	Mean Annual Temp.	Difference of Mean Temp. of Summer and Winter.	Difference of Mean Temp. of Warmest and Coldest Month.	Mean Difference of Successive Mo's.	Difference of the Successive Seasons.				Difference of the Successive Months.											
					Of Winter and Spring.	Of Spring and Summer.	Of Summer and Autumn.	Of Autumn and Winter.	Of Jan and Feb.	Of Feb. and Mar	Of Mar. and April	Of April and May.	Of May and June.	Of June and July.	Of July and Aug.	Of Aug. and Sept.	Of Sept. and Oct.	Of Oct. and Nov.	Of Nov. and Dec.	Of Dec. and Jan.
St. Augustine, - -	72.24	19.22	21.30	3.55	7.72	11 50	8.49	11.41	2.82	1.56	2.15	7.76	4.68	1.24	0.32	3.12	5.95	6.14	6.09	0.77
Fort King, - -	72.66	22.42	25.69	4.28	10.78	11.64	12.12	10.30	4.47	0.28	7.75	5.50	6.13	0.91	0.40	2.11	8.71	10.83	2.73	1.56
Fort Brooke, - -	73.19	16.02	17.68	2.97	6.69	9.33	6.45	9.57	2.81	0.08	4.79	6.12	3.61	0.53	0.64	1.78	3.97	5.33	4.95	1.01
Key West, - - -	76.09	11.34	14.66	2.44	5.39	5 35	4.43	6.91	4.22	1.56	1.98	3.53	1.29	2.08	1.53	0.17	4.13	3.53	3.15	2.15

III. *The Mean Annual and Monthly Ranges of Temperature.*

Places of Observation.	Mean Annual Temp.	Annual Range.			Mean of the Monthly ranges	Jan.			Feb.			Mar.			April			May.			June.			July.			Aug.			Sept.			Oct.			Nov.			Dec.		
		Range.	Maximum.	Minimum.		Range.	Maximum.	Minimum.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.	Range.	Max.	Min.
St. Augustine, - -	72.24	59	93	34	23	35	78	43	30	79	49	25	78	53	31	80	49	20	88	68	17	90	73	14	92	78	12	91	79	14	86	72	22	82	60	22	78	56	36	77	41
Fort King, - -	72.66	78	105	27	40	50	83	33	41	84	43	48	87	39	39	93	54	33	97	64	32	105	73	29	102	73	32	104	72	29	99	70	50	91	41	52	82	30	43	79	36
Fort Brooke, - -	73.19	56	93	37	29	34	77	43	35	81	4:	35	84	49	35	87	52	23	90	67	24	91	67	19	92	73	19	92	73	23	91	68	32	88	56	32	84	52	40	80	40
Key West, - -	76.09	37	89	52	16	23	80	57	20	81	61	20	85	65	1	84	65	15	87	72	13	86	73	11	88	77	14	88	74	11	87	76	15	85	70	15	80	65	16	78	62